[From Schenckius: Observationum Medicarum, Francofurti, 1609]

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THE STRENUOUS LIFE OF A PHYSICIAN IN THE 18TH CENTURY*

By SIR ST. CLAIR THOMSON, M.D.

LONDON

The Medical Societies of London

WE have, in London, two flourishing medical associations. The elder one is the Medical Society, founded in 1773. In that year there were colonies in North America, but no United States, and your forefathers as well as mine were the subjects of that King George III for whom the epitaph was suggested: "Here lies a man who was in some respects a darned bad King, but in other respects he was a darned sight worse." Anyhow, the Medical Society of London at its foundation belonged to both of us and I regard its inception and its founder as belonging just as much to you as does Shakespeare, Milton or William Harvey. The other Society in London is the Royal Society of Medicine, with its 4000 members, annual expenditure of $100,000, and the most important medical library in the British Empire. In size this library is only second to your own in the Surgeon General's Office in Washington. This younger but larger Society originated in 1805 by a secession from the old Medical Society. How that secession came about I will explain later on. As I have been successively President of both societies, you can appreciate that now they dwell together in harmony.

The Strenuous Life of an 18th Century Physician

This evening I am directly concerned in an attempt to interest you in the founder of the old Medical Society, for he is the physician who in the 18th century so well filled the unforgiving minute with sixty second's worth of distance run that I think you will agree that the strenuous life was invented long before President Roosevelt did so much to popularize it. We are apt to think that with trains, telephones, typewriters, automobiles, aeroplanes and other mechanical aids to hurry and worry, we are living a fuller, more varied and more exhausting life than our forefathers of the spacious and leisured days when George III was king. I hope to be able to show that this is a misconception. Life has been levelled up for the masses, who are now provided with leisure, comforts, interests and distractions unknown to their grandfathers. But, as we shall see, people of our type, the educated, professional classes, were, in those days, perhaps better off and happier. They had less of that unrest which men miscall delight, but their lives were as full as ours, their fields of activities as varied, their interests as wide and diversified, and very possibly their general culture was superior.

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*Being the William Potter Memorial Lecture, delivered in Philadelphia, April 25, 1928. The Introduction to this lecture, by Alba B. Johnson, follows.

JOHN COAKLEY LETTSOM

The founder of the old Medical Society, and the man who led this strenuous life in London one hundred and fifty years ago, was John Coakley Lettsom (1744–1815). His career will make a particular appeal to the inhabitants of the city of Philadelphia, for he was a Quaker.

His name is known to most of you by the well-known lampoon:

I, John Lettsom,
Blisters, bleeds and sweat's 'em;
If after that they please to die,
I, John, lets 'em.

HIS EARLY LIFE

He was one of a seventh pair of twins, and he and his twin brother alone survived infancy. He was born in the West Indies, and may have had some French blood in his veins, for in a letter he writes that he had "the volatility of the Creole with the plodding industry of the German." He was sent to England at the age of six, to a school in Lancashire, kept by the Society of Friends.

The healthiness of this school is testified to by the fact that during the forty years that his school was under the head-mastership of Lettsom's teacher, only one death occurred; this was the case of Springett Penn, the son and heir of the Penns of Pennsylvania. At the age of fourteen his school education was finished and he was apprenticed to a surgeon in Yorkshire from his fifteenth to his thirtieth year. During this period he learned some Greek, more French and enough Latin to understand lectures delivered in that tongue, and as he himself records, he "was pretty well qualified to maintain a conversation or dispute" in Latin.

His father had died in the West Indies, and his mother had married again. At the age of twenty he started for London, where he was without a relation and did not know a friend. It makes his subsequent career the more interesting if we recollect that he had no great social or family influence, that he never attended any noted school or had a regular university course, that he was not a Fellow of the College of Physicians, that he never held any Court appointment and was not on the staff of any well known London hospital. He may have had his good turns of fortune, but he had few advantages in his birth, education and upbringing, and the success of his evidently healthful, happy, vigorous and useful career was due almost entirely to his own application, his keenness in his profession, his love of humanity, the breadth of his interests, his zest for life and his happy disposition.

His subsequent career is so well epitomised in a letter he wrote twenty-five years later that I cannot do better than transcribe it:

> London, December 31, 1791.
>
> Medicine is rather a practical than a brilliant art, and depends upon study as much as genius. Poverty led me to physic. I was placed with a country apothecary, whose fee was moderate. I had no particular predilection for medicine. I never possessed genius; my memory was bad; I made dictionaries and tables of my own invention; to assist memory, I formed indexes of what I read, and by industry acquired something. I came to London, and saw Dr. (John) Fothergill, my ambition was inflamed, and I dared to say, London shall be my theatre; but having no more money than to carry me through the hospitals I could not attend any lectures, and upon this depended my improvement; for instead of hearing and learning of lectures I was compelled to learn at the bed of sickness. Here I saw nature, and learnt my art without the leading-strings of professors. I acquired an early habit of behaving with kindness to the sick, and having known want, I knew how to sympathise with distress. After two years in an hospital I went to the West Indies to get assistance to bring me upon the theatre where I now act. Six months abroad enabled me to visit London, Edinburgh, and Leyden, and ultimately to sit down in the first city; and I know not why any other person with £500 may not do the same.
>
> Yours respectfully,
> J. C. Lettsom.

This is a good letter with a brave ring in it, revealing much of Lettsom's character both by what it states and by what it omits. Lettsom does not mention in this letter that though he returned for the first and only time in his life to his native island to get assistance, his first action on arrival in the West Indies was to free the fifty slaves he had inherited. Apart from these slaves and a small portion of land, he was not possessed of $250 in the world. "The moment I came of age," as he writes in another letter (January 20, 1791), "I found my chief property was in slaves, and without considering of future support, I gave them freedom, and began the world without fortune, without a friend, without person, and without address."

HE STARTS PRACTICE

He started practice in his native island in the West Indies at the age of twenty-three; in the short space of five months he amassed the surprising sum of $10,000. He gave half of this to his mother; returned to Europe; spent a *Wanderjahr* at Edinburgh, Paris and elsewhere, took his M.D. at Leyden on June 20, 1769 and, as we read in his letter, started his London career with a capital of $2500.

HIS INCOME

He must have had a keen sense of the business side of his profession. At the age of thirty-nine (1783) he received $15,000 in fees. Between the ages of forty-two and fifty-six he earned between $25,000 and $60,000 annually. When we remember Lettsom's lack of professional prestige, his comparative youth, his distinguished contemporaries and the great purchasing power of money one hundred and forty years ago, this goodly income, so far as my experience goes, is a higher pecuniary reward than the physician of the present day can hope for.

In spite of this good income his munificence in charity and his hospitality involved him in lavish expenditure. He writes that with one domestic and another, in his town house and his country house, he maintained a household of twenty-two.

His Rural Retreat

The country house he calls: "my rural villa four miles from town." As a matter of fact it was at Grove Hill, Camberwell, a stone's throw from my own hospital, King's College Hospital. You may still see a thatched cottage, one of his lodges, in the Grove, and there is a cross street called "Lettsom Street." But all is built over where, in 1779, he had his five acres of garden, two hundred fruit trees, a botanical garden, a large museum, a library of 12,000 volumes, an apiary of sixty-four hives, walks, lawns, fountains, ponds, groups of statuary, an avenue called "Shakespeare's walk," with what he called "an uncommonly fine statue of our immortal dramatist" at the end of it. Referring to his week-ends at Camberwell, he mentions that he had "escaped depredators and robbers pretty well, not having been attacked by highwaymen above four times in thirty years." My motor car runs me to Camberwell in twenty-five minutes, through the long, weary, sordid and mean streets which have replaced the country lanes where Lettsom's coach once rolled.

His Strenuous Life

Lettsom's good income, which he spent so generously, was earned by constant hard work. As early as the age of twenty-three he records that he seldom prescribed for fewer than fifty and often twice as many patients before breakfast. When he was thirty-eight he wrote: "Sometimes for the space of a week, I cannot command twenty minutes' leisure in my own house." At the age of forty-seven he observed: "During the last nineteen years not one holiday have I taken, and this will probably be the last of my life, unless sickness compels me to seek leisure."

The "holiday" here referred to consisted in travelling by coach to Margate, spending two hours on important business there and returning the same day, 144 miles in one day and night, and by coach! In another letter he records that his practice had not suffered him to sleep in his own bed for thirteen following nights, and he evidently spent much, not only of his days but of his nights, in his travelling coach, for one correspondent (February 8, 1783) reproached him for "converting his carriage into a dormitory and a sutling-booth." His carriage served him for still another purpose: he lived in the days when letter-writing was an art; he was a voluminous writer, at times keeping up frequent communication with two hundred correspondents, and yet nearly all his letter-writing was done in his carriage. He writes: "As I live in my carriage, seldom having less than three pair of horses a day, and neglecting my meals, except once a week when I dine with my wife, I have some time to preserve my correspondence, having always in the carriage pen, ink and paper, to amuse myself if I do not amuse my correspondents." In spite of this he records in his seventieth year that, owing to his large correspondence, he was seldom in bed before one in the morning (March, 26, 1814). When we recall the condition of the roads in the eighteenth century, the pace at which his coach must sometimes have travelled, and the non-invention of stylographic pens, it is astonishing to note the number, length and completeness of the letters which have been preserved, and to read, in a letter dated September 25, 1804: "My professional duties incessantly occupy me, and compel me to write all my essays in my carriage."

FAVOURITE HOLIDAY

The fullness of his life may also be judged from another record of his favourite holiday. It is described in the following words by his biographer, Pettigrew:

> "The only relaxation, if such it may be called, that Dr. Lettsom ever permitted himself to enjoy was an annual visit to Margate, to attend the anniversary of the Institution (i.e., the Sea Bathing Infirmary). For this journey he usually allotted seventy-two hours. He left town on the Saturday sufficiently early to get to Margate in time to hear the charity-sermon preached on the Sunday morning on behalf of the Institution. The remainder of the day he spent in visiting a few families in the town at Ramsgate and at Broadstairs. On Monday he examined every patient in the Infirmary, attended the General Meeting at the Assembly-house, dined with the Governors and friends of the Charity, and at seven o'clock set off for London, where he arrived on the Tuesday morning. This excursion always afforded the Doctor very great satisfaction."

No loafing week-end this for the busiest physician in London!

On the occasion of another of his visits he tells us that he sailed from Billingsgate in the packet at four o'clock on the afternoon of the twenty-eighth and got to Margate at nine on the twenty-ninth. He "left Margate at nine in the evening of the thirtieth and arrived in London by chaises at ten o'clock in the morning." A single night in a bed, sandwiched between two strenuous days, preceded by one night's tossing down the river in a packet, and followed by a third night of thirteen hours' jolting in post-chaises was not bad going for a man of sixty-nine! (Diary, August 28 to 30, 1813.)

MANIFOLD INTERESTS

If all these strenuous days and nights had been devoted solely to his extensive practice, we should not be surprised. But his varied interests and self-imposed duties extended over a large variety of subjects, and he rendered important public services as a philanthropist. He founded the General Dispensary in Aldersgate Street in 1770 (the first of its kind in London); he established the Sea Bathing Infirmary at Margate; he was the chief Founder of the Medical Society; he was an active member and a lecturer of the Philosophical Society; he was the Founder of the Royal Humane Society; he was a friend and supporter of Edward Jenner, and an active supporter of the recently introduced vaccination for smallpox; the reform of prisons was responsible for his friendship and admiration for John Howard, and the amelioration of the condition of the poor and helpless was his constant care. He was the first man to introduce into England the mangel-wurzel, and he always kept up his interest in botany, agriculture and fossils. He wrote a book called the "Naturalist's Companion" which ran through three editions, two editions of 1000 being sold within twelve months (Letter 109, December 1, 1804). He pointed out the use of birds, even crows, and of moles, in

Nature's economy, and pleaded for their preservation. He anticipated our cult of the open window, for he wrote an essay on "The effects of heated and stagnant air."

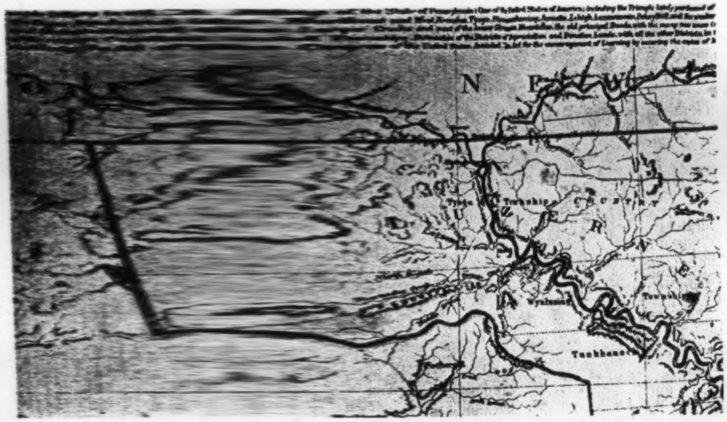

Fig. 1. Map of Pennsylvania Showing the District Called "Lettsom," and, Farther South, That on Loyalist Creek, Called "Fothergill," Belonging to Richard Rush. (From Howell's Map of Pennsylvania, 1792.)

American Friendships

The many honours conferred on Lettsom are good evidence of the general opinion entertained respecting his benevolent character and his literary and philosophical talents. Many of these attentions came from America, a part of the world where he had numerous friends and was highly respected. Indeed, in his time, no student from America was thought properly equipped for Europe unless provided with an introduction to Lettsom. So great was the faith in his judgment that the selection and purchase of books for the Pennsylvania Hospital was entrusted to him. He had a long and interesting correspondence with Dr. Benjamin Rush, whom he called the "Sydenham of America," but whom his own countryman, Professor Charles D. Meigs, more aptly called the "American Galen." A rich tract of land, the property of his friend Dr. Benjamin Rush, upon Sugar Creek, a stream emptying itself into the northeast branch of the Susquehanna River, bears his name, or at least did, when his Memoirs were published by T. J. Pettigrew in 1817 (1:101, 1817).

Through the great kindness of Professor W. W. Keen I have been able to trace this tract of land, and Mr. Thomas L. Montgomery, of the Pennsylvania State Library, Harrisburg, has been good enough to supply a copy of the map reproduced herewith (Fig. 1). He points out that the plots in this plan were not owned by Dr. Benjamin Rush, the hero physician at the time of the yellow fever in Philadelphia in 1793, but by his son, Richard, Attorney General, afterwards Secretary of the Treasury, and at one time Minister to England. Mr. Montgomery also informs me that there is no mention of the two names, Lettsom and Fothergill, in the modern maps nor in the Gazetteer.

Lettsom was the first to send Jenner's vaccine lymph across the Atlantic, consigning it to the care of his friend Dr. Waterhouse, Professor of Medicine in the University of Cambridge, Massachusetts.

He sent the seeds of the mangel-wurzel to Dr. Benjamin Rush, of Philadelphia, who acknowledged them as follows: "Many thanks to you for the seeds of the mangel-wurzel. I have distributed them extensively. To our great and good Virginian farmer, General Washington, I have sent the largest number of them." (Letter 205, May 4, 1788.)

I need not remind a Philadelphia audience that Dr. Rush was a forerunner of prohibition. In the Memoirs of Lettsom we read that: "From Dr. Rush he obtained the idea which induced him to construct the curious and ingenious Moral and Physical Thermometer, or Scale of the Progress of Temperance and Intemperance."* (Fig. 2.)

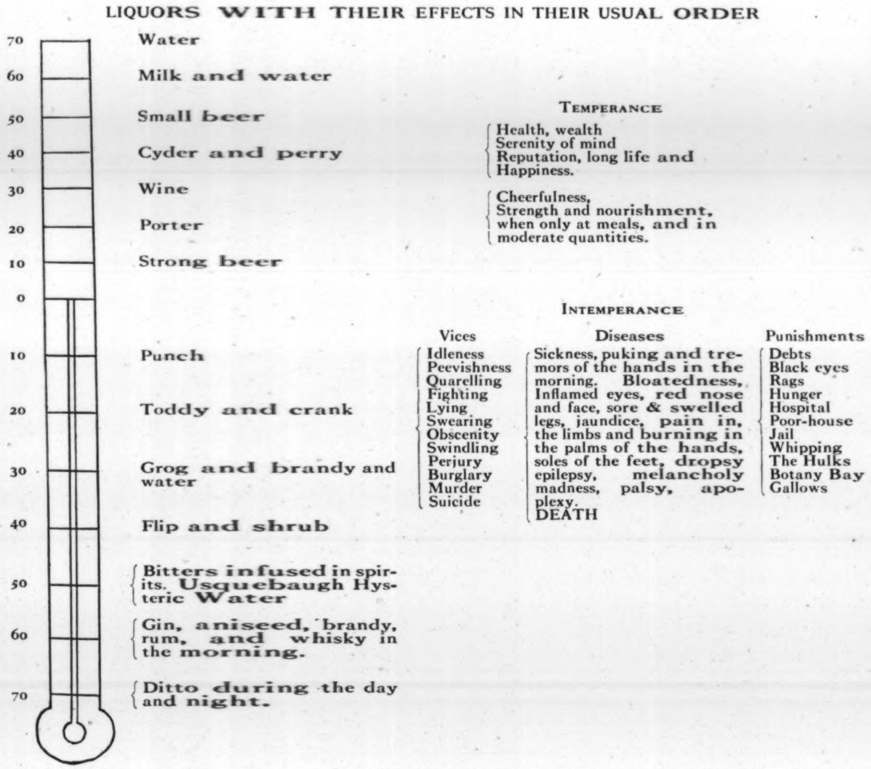
LIQUORS WITH THEIR EFFECTS IN THEIR USUAL ORDER
70 Water
60 Milk and water
50 Small beer
40 Cyder and perry
30 Wine
20 Porter
10 Strong beer
0
10 Punch
20 Toddy and crank
30 Grog and brandy and water
40 Flip and shrub
50 Bitters infused in spirits. Usquebaugh Hysteric Water
60 Gin, aniseed, brandy, rum, and whisky in the morning.
70 Ditto during the day and night.
TEMPERANCE
Health, wealth
Serenity of mind
Reputation, long life and Happiness.
Cheerfulness,
Strength and nourishment, when only at meals, and in moderate quantities.
INTEMPERANCE
Vices
Idleness
Peevishness
Quarelling
Fighting
Lying
Swearing
Obscenity
Swindling
Perjury
Burglary
Murder
Suicide
Diseases
Sickness, puking and tremors of the hands in the morning. Bloatedness, Inflamed eyes, red nose and face, sore & swelled legs, jaundice, pain in, the limbs and burning in the palms of the hands, soles of the feet, dropsy epilepsy, melancholy madness, palsy, apoplexy.
DEATH
Punishments
Debts
Black eyes
Rags
Hunger
Hospital
Poor-house
Jail
Whipping
The Hulks
Botany Bay
Gallows

FIG. 2. LETTSOM'S "MORAL AND PHYSICAL THERMOMETER, OR SCALE OF THE PROGRESS OF TEMPERANCE AND INTEMPERANCE."

The following list contains some of the honours he received from America:

1788. Fellow of the American Academy of Arts and Sciences.
1789. Fellow of the Medical Societies of New York and New Haven.
1790. Member of the University of Cambridge, Massachusetts. L.L.D. University of Cambridge, Massachusetts.
1791. Hon. Member of the Massachusetts Humane Society.
1792. Hon. Member of the Medical Society, Massachusetts.
1792. Member of the Pennsylvanian Society for Promoting the Abolition of Slavery.
1792. Member of the Massachusetts Historical Society.
1793. Hon. Member of the Massachusetts Agricultural Society.
1795. Corresponding Member of the Historical Society of Boston.
1798. Hon. Member and one of the Conservators of the Hospital of New York.

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* Pettigrew, Thomas Joseph. Memoirs of the Life and Writings of the late John Coakley Lettsom. Lond., Longman, 1:160, 1817.

1801. Hon. Member of the Humane Society of Philadelphia.
1802. Associate of the College of Physicians of Philadelphia.

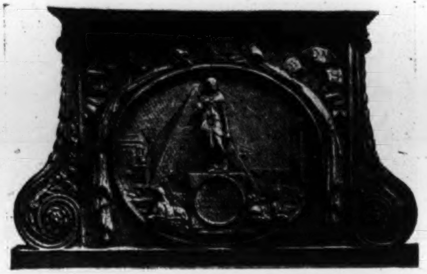


Fig. 3. Plaque of the Medical Society, Which Stood over the Door of the Society's House in Bolt Court for One Hundred and Twenty-eight Years and Is Now Affixed over the Mantelpiece in the Present Home of the Society.

1803. Hon. Member of the Medical Society of Philadelphia.
1808. Corresponding Member of the Medical Lyceum of Philadelphia.
1813. Hon. Member of the New York Historical Society.

Lettsom and the Foundation of the Medical Society

The most enduring act of Lettsom's strenuous life was the founding of the Medical Society in 1773. He drew up some "Hints on the Establishment of a Medical Society" and so full were they that these "hints" ran to 24 pages. It was characteristic of the man to say in the Introduction that such societies "excite a generous ardour in liberal minds and raise even envy itself into useful emulation." More than this, he made a liberal gift of several hundred volumes and valuable manuscripts and presented the Society with the freehold of a house in Bolt Court, Fleet Street. Over the door was a plaque. When this house off Fleet Street was pulled down, the plaque was moved to the Society's present home in Chandos Street and set up over the mantelpiece in the library (Fig. 3). It is a bas-relief, beautifully modelled in clay and is stamped with the date 1787. Inside a carved wooden border is the title "The Medical Society of London," beneath this is a draped oval, on which an allegorical group is modelled in relief. In the distance, and forming the background, appears the Great Pyramid of Egypt, skirted by palms. In front of this, and in the centre, the principal figure is that of the goddess, the Isis of Sais, on a pedestal. This goddess is supposed to have been the discoverer of medicine and of the value of drugs. Amongst other functions she presided at births and rocked the cradle of the Nile. In brief, she was Nature. In her left hand she holds a globe and in the right some ears of corn. Crouched on each side of this is a sphinx, emblematic of mystery. A bridge over a river, a temple, a broken column, and an urn on an altar are also represented. In the front of the pedestal is a coiled serpent, representing eternity, and within the circle is the following inscription:

ΕΤΩ
ΕΙΜΙ ΠΑΝ ΤΟ ΤΕΤΟΝΟΣ
ΚΑΙ ΟΝ, ΚΑΙ ΕΣΟΜΕΝΟΝ,
ΚΑΙ ΤΟΝ ΕΜΟΝ ΠΕΠΛΟΝ
ΟΥΔΕΙΣ ΝΩ ΘΝΗΤΘΝ
ΑΠΕΚΑΛΥΨΕΝ

signifying: "I am whatever is, or has been, and will be; and no mortal has hitherto drawn aside the veil."

Lettsom must have been much impressed with this emblematic group and with the inscription, for he had an exactly similar tablet erected over the front facade of his house at Camberwell.

A Well-known Picture

It has been suggested that this generous act has been perpetuated in the well-known picture by Samuel Medley of the founders of the Medical Society (Fig. 4). It is claimed that there is no other oil painting in the world which contains so many portraits of medical men, actually painted from life. Medley, the artist, was the better able to do so as they were all his contemporaries and he was an intimate associate of most of them. Lettsom is seen standing in the front of the picture and near the centre. It has been suggested that he is in the act of presenting the lease of his house to the Society. He might be delivering the Annual Oration, which he did both in 1778 and 1804. Anyhow, he is easily recognised, for you will notice that, being a Quaker, he wears a bob-wig, unpowdered, that his clothes are of sober cut, and his stockings of plain style and material.

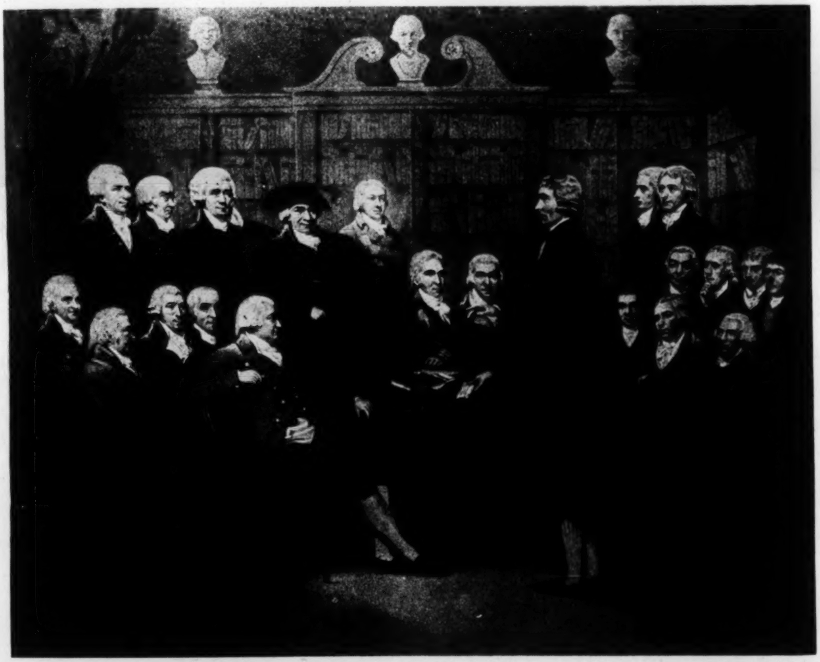
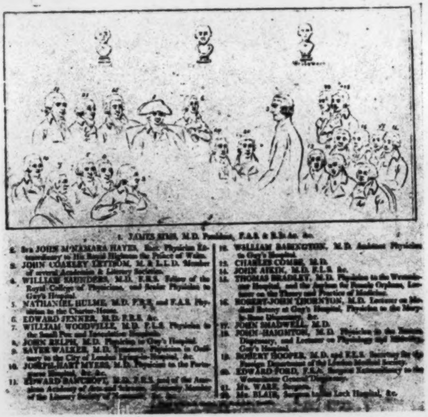


FIG. 4. THE FOUNDERS OF THE MEDICAL SOCIETY OF LONDON. (FROM THE PAINTING BY SAMUEL MEDLEY IN THE SOCIETY'S HOUSE.)

A very different figure is that of the gentleman in white silk stockings sitting facing him in an easy and assured attitude. This is Sir John Hayes, Baronet, Physician to the Prince of Wales (afterward George



1. JAMES SIMS, M.D. [illegible], F.A.S. & R.I.Ac. &c.
2. Sir JOHN M'NAMARA HAYES, Bart. Physician Extraordinary to His Royal Highness the Prince of Wales.
3. JOHN COAKLEY LETTSOM, M. & LL.D. Member of several Academies & Literary Societies.
4. WILLIAM SAUNDERS, M.D. F.R.S. Fellow of the Royal College of Physicians, and Senior Physician to Guy's Hospital.
5. NATHANIEL HULME, M.D. F.R.S. and F.A.S. Physician to the Charter-House.
6. EDWARD JENNER, M.D. F.R.S. &c.
7. WILLIAM WOODVILLE, M.D. F.L.S. Physician to the Small Pox and Inoculation Hospitals.
8. JOHN RELPH, M.D. Physician to Guy's Hospital.
9. SAYER WALKER, M.D. Treasurer, Physician in Ordinary to the City of London Lying-in Hospital, &c.
10. JOSEPH HART MYERS, M.D. Physician to the Portuguese Hospital, &c. &c.
11. EDWARD BANCROFT, M.D. F.R.S. and of the American Academy of Arts and Sciences, [illegible] Member of the Literary Society of [illegible], &c. &c.
12. WILLIAM BABINGTON, M.D. Assistant Physician to Guy's Hospital.
13. CHARLES COMBE, M.D.
14. JOHN AIKIN, M.D. F.L.S. &c.
15. THOMAS BRADLEY, M.D. Physician to the Westminster Hospital, and the Asylum for Female Orphans, Lecturer on the Theory and Practice of Medicine.
16. ROBERT-JOHN THORNTON, M.D. Lecturer on Medical Botany at Guy's Hospital, Physician to the Mary-le-Bone Dispensary, &c.
17. JOHN SHADWELL, M.D.
18. JOHN HAIGHTON, M.D. Physician to the Surrey Dispensary, and Lecturer on Physiology and Midwifery, Guy's Hospital.
19. ROBERT HOOPER, M.D. and F.L.S. Secretary for the Foreign Department of the London Medical Society.
20. EDWARD FORD, F.S.A. Surgeon Extraordinary to the Westminster General Dispensary.
21. Mr. WARE, Surgeon, &c.
22. Mr. BLAIR, Surgeon to the Lock Hospital, &c.

FIG. 5. KEY TO GROUP SHOWN IN FIGURE 4.

IV), and described by Medley, the artist, as "the most finished courtier of his acquaintance." The President of the moment can be recognised as he is wearing a cocked hat, as enacted in Rule 4, Chapter 4, of the statutes originally drawn up by Lettsom, viz.: "that the President, whilst in the Chair, shall be covered, except when addressing himself to the whole Society." The name of this worthy was James Sims (1741–1820), reported to have been a good-humoured, pleasant man, full of anecdote and information and endowed with a most retentive memory. As his portrait would suggest, he must have been astute and sagacious. He sold his books to the Society for the sum of $2500 and engaged the Society to pay to his widow an annuity of $150. He possessed to such an extraordinary degree the power of ruling the elections of the Society that he managed to get himself re-elected President during a period of no less than twenty-two years (1786–1808). His constant re-election, indeed, proved unfortunate for the Society, and led to the secession of a number of influential Fellows who in 1805 founded the body which became the Royal Society of Medicine.

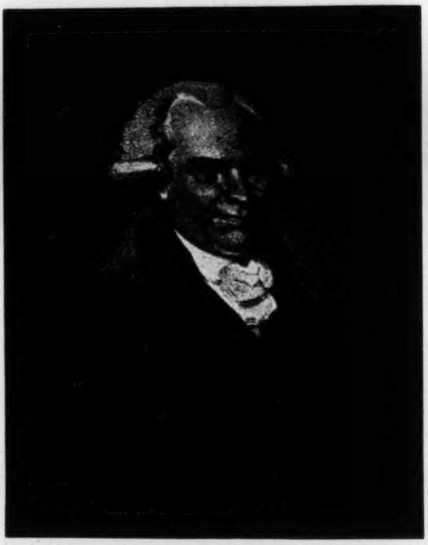


Fig. 6. Dr. James Sims, President of the Medical Society of London for Twenty-two Years, 1786 to 1808. (From an Engraving by N. Branwhite after a Picture by S. Medley.)

I have only to add that this Dr. James Sims was a native of Ireland; and I understand that the Hibernians' genius for political wrangling is a talent even more developed on this side of the Atlantic. Seated immediately behind Lettsom is the sedate and solid figure of Dr. William Saunders (1743–1817) who was the first president of the new Society formed by those who rebelled against the lobbying of Dr. James Sims.

Time will permit only of my directing your attention to one other portrait. It is the one quite in the background, on the left hand of the President. It was absent from the original picture and copies of an engraving by Branwhite are still in existence (and much sought after by collectors) in which this figure is absent. You will notice that it is on a somewhat smaller scale than the others. The explanation is that it is a portrait of Edward Jenner (1749–1823). When the picture was painted Jenner's great discoveries (1796) had not been made. Afterwards, and when he had been elected a Fellow, it was thought right to add to the existing picture the portrait of one so distinguished.

PHILANTHROPIC AND SOCIAL INTERESTS

Soup kitchens, bee-keeping, gardening, temperance, diet, games, exercise, were all dealt with by Lettsom in his three 8vo volumes under the title of "Hints designed to promote Beneficence, Temperance, and the Medical Science." In these are found essays on such varied subjects as Poverty, Discharged Prisoners, Prostitution, Infectious Fever, a Samaritan Society, Crimes and Punishments, Wills and Testaments, Lying-in Charities, the Deaf and Dumb, Village Societies, the Blind, a Society for Promoting Useful Literature, Hints to Masters and Mistresses, Religious Persecution, Humane Societies for the Recovery of Drowned Persons, the Cow-Pock, Card Parties, Sunday Schools, the Philanthropic Society, Dispensaries, Hydrophobia, Sea-bathing Infirmaries, and a substitute for Wheat Bread. He wrote on the use of maize flour in war time, and, although no Scotsman, he dilates on the value of porridge, and gives excellent directions for making it properly!

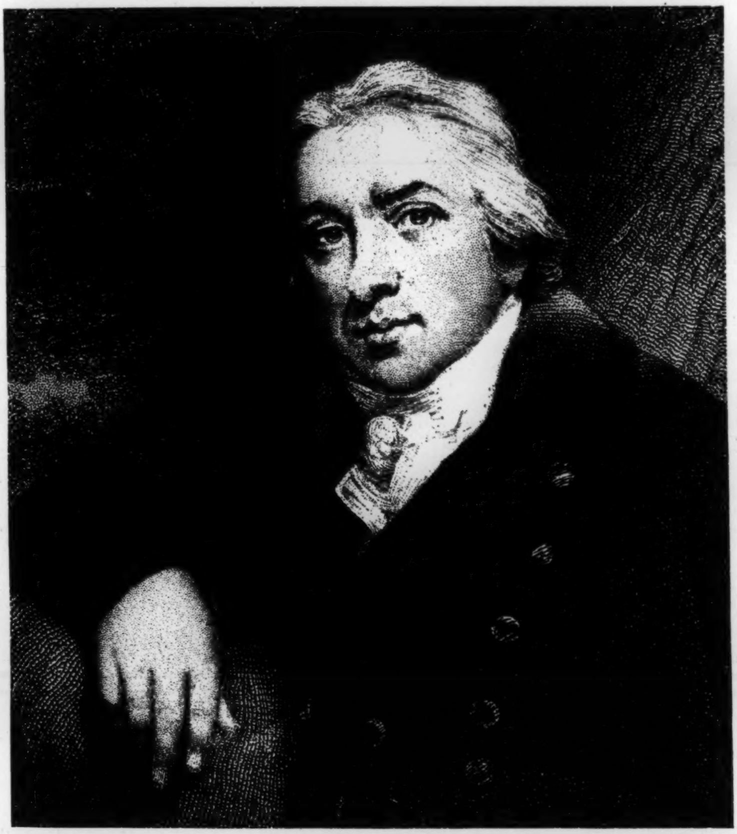


FIG. 7. EDWARD JENNER, FELLOW OF THE MEDICAL SOCIETY OF LONDON. (FROM AN ENGRAVING BY E. S. SCRIVEN, AFTER J. R. SMITH.)

HIS MANY ACTIVITIES

His large practice and these multifarious occupations did not exhaust Lettsom's boundless activity. Although a Quaker he was, particularly for that period, remarkably free from religious bigotry. In spite of the pacifist tenets of his sect he was gazetted Physician to the Camberwell Volunteer Infantry in September 1803, and although he writes: "As a Quaker I could not adopt a military character," yet he exclaims, "May I fall by the sword rather than live to see this free country the domain of a Corsican murderer and usurper."

Lettsom was most sociable and thoroughly cosmopolitan in his tastes and friendships. Time will only allow of my enumerating some of the personalities he entertained and came in contact with. King George III not only welcomed him at Court but, as Lettsom himself records: "admitted me more than once into his presence without a Court dress, which I never could assume, and perhaps I am the only person who ever kissed his hand unpowdered and unsworded."

TALENT FOR FRIENDSHIP

He records his impression of Pitt and Fox; he corresponded with "General Washington of America," Benjamin Franklin, Erasmus Darwin, Baron Halles and Linnaeus. He came in contact with Oliver Goldsmith, Dr. Heberden, William Fox and David Garrick. He knew the celebrated Lady Hamilton and was very grateful to her for her kindness to his son when visiting Naples: "A fine figure, that medium which has softness without grossness, and tender expression without languor."

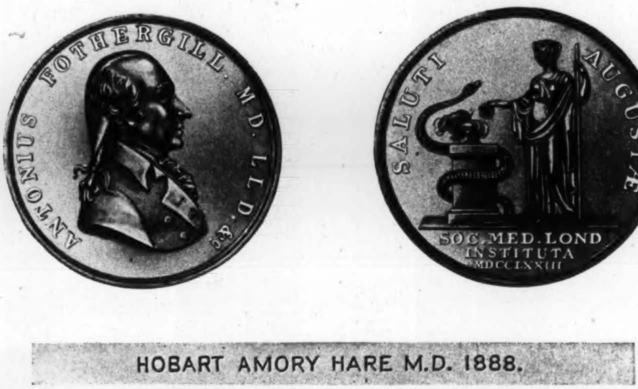

ANTONIUS FOTHERGILL M.D. LL.D. &c
SALUTI AUGUSTÆ
SOC. MED. LOND
INSTITUTA
MDCCLXXIII
HOBART AMORY HARE M.D. 1888.

FIG. 8. FOTHERGILLIAN MEDAL "IN GOLD OF 10 GUINEAS' VALUE," 1784. ENDOWED WITH $2500. ADJUDICATED ON FOTHERGILL'S BIRTHDAY, MARCH 8. WON IN 1791 BY LETTSOM, AND IN 1888 BY DR. HOBART AMORY HARE.

Boswell and Samuel Johnson were frequent visitors at his house. He says of Johnson: "He was certainly not polite, but he was not rude; he was sometimes jocular, but you felt as if you were playing with a lion's paw."

SOCIABILITY

Lettsom's conviviality is illustrated by the following description of his meeting with the renowned Admiral, Sir William Sydney Smith: "At Mr. Abraham Goldsmith's ball I met a man I had wished much to know, Sir Sydney Smith, so I told him and he assured me he had a similar penchant. We ate a sandwich together, and then hob-a-nob'd our glasses of porter, and at half-past one in the morning I left him dancing with a Jewess." This cheery picture of a Quaker in his sixty-first year, a leading physician in full practice in London, fully bears out his own statement: "My spirits carry me through a succession of employments with facility."

THE STRENUOUS LIFE

Evidently the strenuous life was not invented by the late President Roosevelt; and a physician of the 18th century could work as hard as any hustler of our own time to earn neurasthenia and nervous prostration. Like the rest of us, Lettsom wrote of "the whirlwind in which I live and move"; he expressed "a decreasing ardour after medical employment and a thirst for rural retreat"; and he made a determination to "sleep every night out of town, quitting night business and long night journeys." Although he deplored that his "professional duties obliged him to remain a denizen of the metropolis," yet he was able to hob-a-nob at balls at half-past one in the morning and take his week-end rest by a rush to Margate and back! The fact is he lived his life and revelled in over-work. He believed in varied interests and in the virtue of enjoyment. Yet he had no need to work so hard for mere money, for at the age of twenty-six he married the daughter of a wealthy tin-plate manufacturer with a considerable fortune.

HEALTH AND HYGIENIC HABITS

He was astonishingly active up to his last illness. He walked to see patients for two or three hours in the morning. His habits were temperate. Before retiring to rest he uniformly bathed his limbs in cold water, and (what must have been very unusual one hundred fifty years ago) in the morning, as he quaintly puts it, he "aspersed the whole of his body with the same." To this practice he attributed the excellent state of health he preserved.

He had the gift of friendship and the gentle art of not making enemies. When nearly seventy years of age, he was still full of the *joie de vivre*, ready to please and be pleased, and he seldom refers to a social gathering without commending the "pleasing conviviality" which marked it.

Being a Quaker, he had no crest or coat-of-arms; but the motto on his book-plate is "Dum Spiras Spes."

THE END

On October 22, 1815, the year of Waterloo, he assisted at a post-mortem examination, remaining for two hours in a cold room. He died ten days later, on November 1, 1815, though five days before he had been out to visit his last patient. He was in his seventy-first year. He had warmed both hands against the fire of life, and, when it sank, he was ready to depart.

In the British Navy, and I believe in the navies of other countries, there is a guiding principle of work and conduct, a certain unwritten and indefinable influence too elusive to be described. It has come to be known as "the Nelson touch." This very brief sketch of a Quaker physician of the 18th century, a good friend to America, and the founder of the Medical Society of London, prompts me to suggest that we doctors and the public may receive some inspiration in our work by preserving what I venture to call "the Lettsom touch."

WILLIAM POTTER MEMORIAL LECTURE*

INTRODUCTORY

By ALBA B. JOHNSON

PHILADELPHIA

SUNDAY, April 29, was the second anniversary of the death of William Potter, who for thirty years was President of the Board of Trustees of Jefferson Medical College. Under his wise guidance it was changed from a proprietary institution belonging to members of its faculty, operated for private gain, to one of the largest medical college in the land, conducted not for profit but for the education primarily of medical practitioners, whose services are distributed throughout the various states and countries abroad.

Mr. Potter was graduated from the University of Pennsylvania and for many years shared with his brothers the business established by his father under the title of Thomas Potter, Sons & Co. Nevertheless he had an aptitude for public affairs and his business interests were such as to leave him comparative freedom. At the age of thirty-eight he was appointed Special Commissioner to London, Paris and Berlin, to arrange for Sea Post Offices. The following year he was a delegate to the Fourth Congress of the Universal Postal Union at Vienna. A year later he was appointed United States Minister to Italy. This post he found most congenial. He formed a close attachment to Italy and its people which continued throughout his life. In 1898 he went to Porto Rico during the war with Spain. He occupied many positions of public trust.

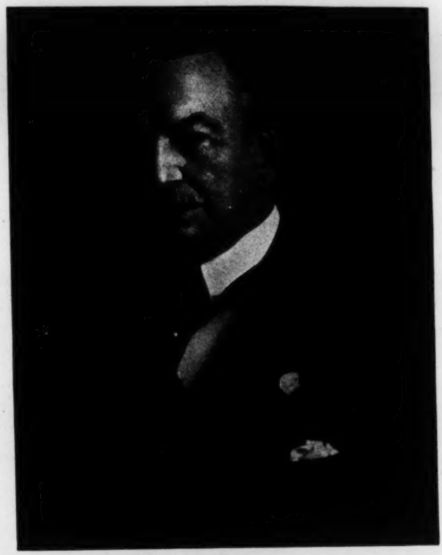
In 1907 he was candidate for mayor of Philadelphia but was defeated. In 1917 during the World War he was Federal Fuel Commissioner for Pennsylvania, a task which he discharged with high credit. He was an industrious and valuable member of the Board of City Trusts. He was a councilor of the Historical Society of Pennsylvania and a manager of the Pennsylvania Institute for the Deaf and Dumb. This constitutes a brief and inadequate sketch of his public relationships. In addition he was a devout and consistent member of the Protestant Episcopal Church.

It is with his connection with Jefferson, however, that we are chiefly concerned. His personal qualities were in large measure responsible for its great success. He was considerate of the prerogatives and the feelings of all. His diplomatic training especially fitted him for smoothing and adjusting differences and rivalries. His honesty, sincerity and good will gave his opinions convincing weight. To a remarkable degree, therefore, Jefferson enjoyed under his leadership, both in its college and hospital, harmony and cooperation and a unity of purpose effective in advancing its efficiency as an agency for medical education and healing. He led it to occupy a deservedly high place among the institutions of its kind.

To Dr. Chevalier Jackson, who brought to Jefferson the fame of his discoveries in bronchoscopy and esophagoscopy, is due the credit for having suggested the establishment of a William Potter Memorial Lectureship, which throughout future years should be an annual event in honor of the memory of him whose life was so closely interwoven with the history of this college. The lecture should be of such notable character as to be a contribution to medical science and serve to add to the fame of our city as a center of medical education. Dr. Jackson mentioned his plan to Mr. William Potter Wear, a beloved grandson of him whose life we are here to commemorate, and Mr. Wear immediately agreed to give the entire amount necessary for its endowment. This generous and loving gift is worthy of all praise, and we may well believe it will serve throughout countless years to perpetuate the memory of William Potter and be of lasting advantage to the medical profession, and to the city of Philadelphia to which he devoted his life.

May I add a few words of personal tribute? It was a source of happiness to be for nearly twenty-five years counted among his friends. He had no age but was ever young. He passed away at the zenith of his powers and when the rewards of his life of usefulness were being reaped in abundant measure. Speaking for his associates as well as myself, his memory will ever be fresh and our happy recollections of his friendship will continue as long as we live.

I take great pleasure in presenting to you, to deliver the First Annual William Potter Memorial Lecture, one who needs no introduction, Sir St. Clair Thomson.



WILLIAM POTTER.

[Following the above Address by Mr. Alba Johnson, Sir St. Clair Thomson delivered the William Potter Memorial Lecture entitled "The Strenuous Life of a Physician in the 18th Century" which is the first article in this issue of the Annals.]

THE DEVELOPMENT OF THE HARVEIAN CIRCULATION*

By ALFRED E. COHN, M.D.

NEW YORK

YOUR request, Mr. President, that I deliver this address commemorating the tercentenary of the publication of William Harvey's "Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus" gave me the liveliest pleasure and afforded me a welcome opportunity. I come to you fresh from the study of a genuinely towering intellect, inspired by the life of a great physician, full of admiration for the nature of his investigations and of the manner of his thought. I am to speak of William Harvey, an ornament to mankind.

A review of Harvey's life leaves the impression that here was a man unusually favored by fortune, one who utilized with great intelligence the rare opportunities which the contemporary world afforded. For William Harvey in view of the discovery he was to make was singularly fortunate in the century and in precisely the period of that century, in which he was born; he was fortunate in his family and in the support and strength which they brought to his aid; his college was chosen for him with extraordinary prescience; he came to Padua just at the right moment; on his return to England he became associated with and was soon elected a Fellow of the Royal College of Physicians of London; he was chosen physician to St. Bartholomew's Hospital within seven years after attaining his degrees; the coveted Lumleian lectureship in anatomy at the College became his in 1615 at the age of 37 and afforded him in the next year the opportunity of teaching for the first time that the blood in the body of animals circulates. He was fortunate finally in his friends, many of whom were devoted to his person; in the fame which came to him in full measure; in the great length of his life of eighty years spent in the complete enjoyment of intellectual vigor.

He was a man of rather low stature, olive complexion, of moderate portliness, if one may judge from the numerous portraits still extant, dark of hair and piercing dark of eye, quick, perhaps abrupt in his gestures, moved easily to anger, but direct, imperious, jealous of the prerogatives of his calling, as witness his St. Bartholomew's reforms, but kindly withal as his friendships with Nardi, Ent, Scarborough and Thomas Hobbes amply show.

It is less on his life though than on his thought that I wish to dwell. And because there seems to be direction in his course, beginning with his entrance at Gonville and Caius College in Cambridge in 1593 when he was but fifteen years of age, we do well to begin at this point. In all probability, the atmosphere of no other college could have directed his attention as this one may have done to anatomical studies.

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* An address delivered before the Harvey Society of New York on the occasion of the tercentenary of the publication of "Exercitato Anatomica de Motu Cordis et Sanguinis in Animalibus" by William Harvey in 1628.

The second founder and Master, John Caius, was himself a physician, most exceptional when heads were usually churchmen. He secured for his college and for Harvey two things of importance, an interest in anatomy and a contact with Padua where he had been student and professor. Caius returned to England in about 1544. Two years later he was giving anatomical lectures and demonstrations at the hall of the barber surgeons, the first to be given in England, in which he revealed to this fraternity "the hidden jewels and precious treasures of Cl. Galenus, showing himself to be the second Linacer." He did moreover obtain for his college of Gonville and Caius "the grant of a charter by which the Master and Fellows were allowed to take annually the bodies of two criminals condemned to death and executed in Cambridge or its Castle free of all charges to be used for the purpose of dissection, with a view to the increase of the knowledge of medicine and to benefit the health of her Majesties lieges." Unfortunately it is not known certainly whether this privilege was used or whether Harvey was exposed to that influence of which this charter was an expression. Caius, like Linacre before and many other Englishmen after him had been attracted to the anatomical lectures at Padua, where he spent somewhat more than five years. He formed a close acquaintance with Vesalius and was indeed his fellow lodger for eight months in the Casa degli Valli just at the time when Vesalius was busy writing his "De Fabrica Humani Corporis." Later, in 1543 he began a journey through the great cities of Italy in the attempt to obtain in their libraries complete

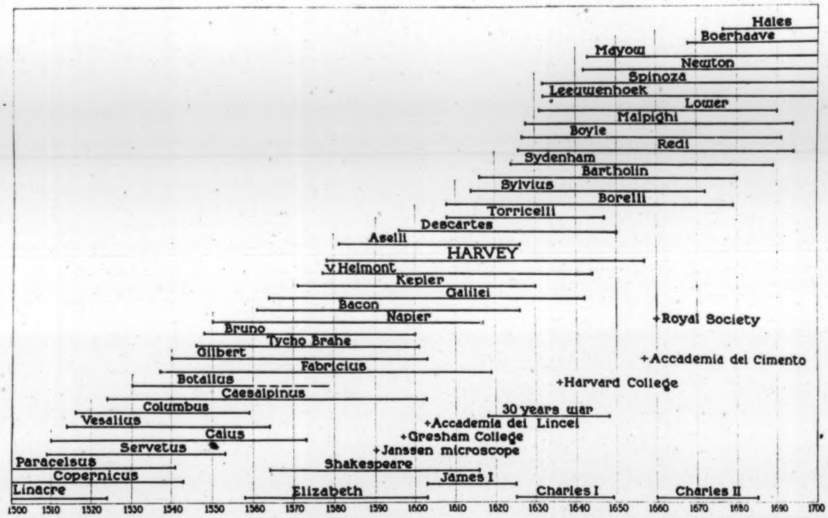

FIG. 1. RELATION IN TIME OF HARVEY TO HIS CONTEMPORARIES IN SCIENCE, TO CERTAIN POLITICAL OCCURRENCES, AND TO IMPORTANT ACADEMIC EVENTS.

Among his contemporaries should be noticed especially Fabricius, Bacon, Galilei, Descartes, Borelli, Sydenham, Malpighi. Shakespeare died just as Harvey began his public scientific career. The Thirty Years War was fought within his lifetime. Also the great English Civil War. During his life also were founded Gresham College, The Accademia dei Lincei and Harvard College. The Royal Society came into existence three years after his death.

and correct versions of Hippocrates and Galen. Venn tells us that of the nine volumes of manuscripts in the library of Caius College given by the Master, the majority consist of treatises written by them. Himself a Paduan, an anatomist, a disciple of Galen and Hippocrates, a student of Vesalius trained in the great Paduan tradition, this was the Master of Harvey's College. It is now known on the authority of Sir Thomas Barlow and of Venn, that Harvey was enrolled a minor pensioner on a scholership. This particular scholarship was granted at the Grammar School at Canterbury, Harvey's school, to students who were intending to study anatomy and medicine and had been established on the advice of Caius. The choice of college therefore, if deliberate was wise, if accidental, fortunate. Caius had been dead (1573) five years when Harvey was born (1578) and twenty when he came to Cambridge (1593).

In 1598, or as Barlow thinks in 1600, with this background, Harvey at twenty entered Padua. Here he lived for four or more probably for two years. Padua must then have been in veritable ferment. Within the century the leaders at Padua, as Sir George Newman reminds us, were an anatomist, a practitioner, a professor and a physicist, Vesalius, Fracastorius, Fabricius, Galilei. Galilei had been there since 1592. The aula magna where he taught adjoined the anatomical theatre. "In 1593, after Fabricius had been professor for thirty years, the Venetian authorities erected for him a small circular theatre which still exists, and here Harvey learned at his feet."

Of Harvey's life in Padua all too little is known. He was a member of the more select Universitas juristarum and he must have attained some prominence for he was elected *conciliarius* of the English nation. His teachers were Fabricius ab Aquapendente in Anatomy, Minadous in Medicine, and Casserius in Surgery. He is believed to have been on terms of friendship with Fabricius for whom throughout his life, as his two treatises show, he entertained sentiments of admiration and affection. After the negative one by Vesalius, it was Fabricius who made the one significant contribution to the knowledge of the anatomy of the organs of the circulation since Galen, fourteen centuries before. The valves of the veins had been known to Jacobus Sylvius, but his description of them had been forgotten and they were rediscovered by Fabricius in 1574. Harvey may have learned about them directly from the Master, but Fabricius's book "De Venarum Ostiolis" was not published until 1603, the year after Harvey returned to England. Great seminal years these must have been, for the interests then aroused are reflected in the two treatises of Harvey that have come down to us. Besides the book on the veins, Fabricius wrote one also called "De Formatione Ovi et Pulli" (1600).

Fabricius was followed in Padua by Casserius and Spigelius, but the great tradition was drawing to an end. With Harvey it passed to England, with Bauhin to Basel, with Bartholin to Copenhagen, with Malpighi to Bologna.

As at Cambridge so in Padua the attempt is baffling to reconstruct the influences which were exerted on Harvey. There were Fabricius and Galilei; there was the tolerant religious spirit of the Venetian republic, free to Protestant as well as to Catholic

Europe; there was the tradition of doubt, the spirit of intellectual freedom; there was indeed the absorbing interest in the entire scientific Renaissance; but what would one not give for reports of the very lectures, the intimate conversations and the spirited discussions, without doubt not always pacific, which kept the town in a ferment of philosophical speculation. This is the knowledge that would give us real insight into what Harvey had stored in his mind as he turned toward England in 1602. Unfortunately all is veiled in mystery. Galilei influenced him no doubt—see the use for instance that he made of arithmetic in calculating the volume output of the heart, perhaps the most striking argument employed in his proof that the blood circulates.

Between 1602, the year of his return to England and 1616 when he began to deliver the Lumleian lectures at the Royal College of Physicians the facts of his life are known but the detail is scant. He became Doctor of Medicine at Cambridge (1602), and years later at Oxford; he married, he was appointed (1609) physician to St. Bartholomew's Hospital; he became Fellow (1607) of the Royal College of Physicians of London. But what his thought was, with whom he associated, what experiments he performed, all is obscure.

The obscurity ceases in the year 1616, the year of greatest importance in tracing the development of Harvey's thought. He was now 38 years old. He had been appointed fourth Lumleian lecturer the year before (August 4, 1615), according to custom, for life. Originally the lecturer was enjoined to lecture twice a week throughout the year, to wit Wednesdays and Fridays, at ten of the clock until eleven. He was to read for three-quarters of an hour in Latin and the other quarter in English "wherein that shall be plainly declared for those that understand not Latin." It was his office to lecture upon the entire subject of anatomy and surgery which, for the purpose, was divided and delivered part by part, over a period of six years. Harvey was now to deliver his first course. The function was surrounded by an elaborate ceremonial. A company of great distinction was present. Although they may not have numbered above forty in all from the college, many of the curious of the town like Evelyn, Digby, Browne and Pepys may have been present. The lectures were delivered in the college, which two years before had been removed from Linacre's own house in Knightrider Street, to Amen Corner at the end of Paternoster Row. It is not altogether clear whether Harvey accurately followed the traditonal order, but it is certain that this first course of the visceral lectures was delivered on Tuesday, Wednesday and Thursday, April 16, 17 and 18, 1616. A week this was of poignant interest to all those interested in the march of great events in the English speaking world, for on the Tuesday next following, April 23rd, the life of William Shakespeare ended at Stratford-on-Avon and there two days later he was laid to rest in the chancel of the parish church.

It is important to dwell with emphasis on the Lumleian lectureship, and on his lecture notes "Prelectiones Anatomiae Universalis," for they mark the date of Harvey's great departure from tradition. They contain complete evidence that what subsequently came to be recognized as the Harveian circulation was already clearly defined in Harvey's mind. He delayed the publication of the results of his observation for twelve years, but in the letter of dedication to Doctor Argent, President of the Royal College of Physicians and to his colleagues which accompanied the "Exercitatio" of 1628 he recalls what they must have known very well:

> "I have already and repeatedly presented you, my learned friends, with my new views of the motion and function of the heart, in my anatomical lectures; but having now for nine years and more comfirmed these views by multiplied demonstrations in your presence, illustrated them by arguments, and freed them from the objections of the most learned and skilful anatomists, I at length yield to the requests, I might say the entreaties, of many, and here present them for general consideration in this treatise."

His book was apparently far from being a new story.

What Harvey's views actually were and how he sought to demonstrate their correctness I mean to analyze later in detail. But in order to understand them, it is necessary to understand the foundation on which he built. For Harvey was not only an original investigator, but was over and above this a profound and learned scholar. He knew all the anatomists and the great writers of the classical world. He knew Hippocrates, Aristotle whom he mentioned as many as fifty times in the notes alone, and Galen. He knew them all; indeed he knew them well. They do in fact ill serve his reputation who undervalue them—their acumen and intelligence, the careful and logical consideration which they, the great thinkers from Aristotle to Fabricius had devoted to solving the problems of the blood and its motion. For it was these men to whom ultimately he rose superior. The study had in point of fact gone forward in relatively few stages. Aristotle built in large measure on his predecessors and was soon followed by the very acute anatomists at Alexandria, especially by Erasistratus. After them no considerable change was introduced until the close study which Galen gave to this problem. And after him the names of three men only need be mentioned to complete the record of significant contributions before the time of Harvey; they are Vesalius, Realdus Columbus and Fabricius.

The ancients in this connection were challenged by three great riddles; the source of animal heat, the meaning of respiration, the function of the blood.

The blood was known to be of two kinds, arterial and venous, different in color and contained respectively in the arteries and veins. Pulsation resulted from a force innate in the blood. All the arteries pulsated in unison and synchronously with the heart. The two bloods moved slowly to and fro each in its channel. It must be clearly understood that slow motion was required to permit time for the exchange of substances between each blood and the tissues. To the ancients the idea that this might be accomplished rapidly was inconceivable, and remained so even in the arguments which Riolanus the younger made against Harvey.

The function of the *venous* blood was to collect nutritive material from the intestines and to transport this by the portal vessels for further elaboration by the liver into *natural* spirits. Its onward course is a matter of first importance. On leaving the liver this blood, the venous blood, *the* blood according to Galen, divided passing downwards and upward. A small amount only, and this also is important, was diverted to what is now known as the right auricle but was then regarded merely as a dilatation of the caval system. It passed next through the tricuspid valve and onward to the lungs through the pulmonary artery. The smallness of the amount which reached the right ventricle and the lungs is a major conception which permitted the maintenance of the ancient system and remained to dog the reforms of Servetus, Columbus and Caesalpinus.

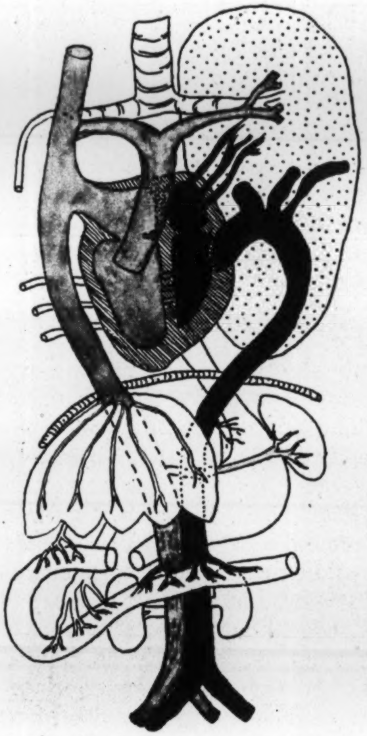

FIG. 2. THE BLOOD FLOW ACCORDING TO ARISTOTLE.

It is necessary to understand that this diagram and the next one may not be taken literally. For this neither the interpretations of the original texts nor the original descriptions themselves present a sufficient degree of accuracy. In this diagram are to be noticed chiefly; the fact that *all* the venous blood enters the right ventricle; that there is no provision for interchange of substance between arteries and veins; that there is no mention of a special cerebral blood supply; that the communication between right and left ventricles differs from Galen's later invention of the pores in that there is some reason to think Aristotle regarded the septum as spongy and itself in the nature of a ventricle.

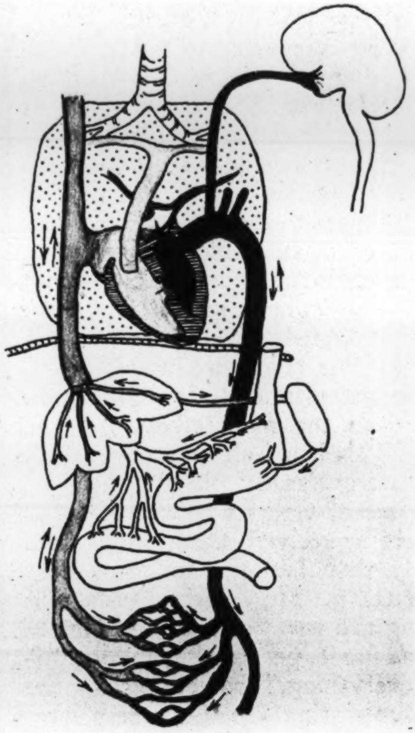

FIG. 3. THE BLOOD FLOW ACCORDING TO GALEN.

The changes which were introduced by Galen in his scheme of the blood flow comprise (1) anastomoses between arteries and veins, the motion of the blood in which was believed to be tide-like; (2) a supply of blood to the brain for the elaboration of vital into animal (psychic) spirits; (3) the entrance of part only of the blood into the right ventricle (indicated by lighter shading) so that in consequence, the liver instead of the heart was the source of the blood and the center of its flow; (4) pores in the septum between right and left ventricles were assumed to exist. This was the system which was universally accepted as correct until the demonstration of the Harveian circulation in 1616.

The *arterial* blood also moved in a slow tidal fashion. It conveyed two things; first the pneuma, a subtle constituent of the air; which was for the function of life an essential element. The pneuma entered the blood in the lungs whence it was carried by the pulmonary veins to the left ventricle, there further to be elaborated into *vital* spirits. The second was heat which was stored in and elaborated by the heart itself. These two qualities, vital spirits and heat were conveyed thence to the tissues. That portion of the arterial blood which went to the brain was further elaborated there into animal spirits or better perhaps called psychic spirits. So refined, this substance passed along the nerves, ultimately to find its way back into the main stream by the veins. This is a Galenic account. But they were already old functions at the time of Galen who according to Allbutt conceived them much less clearly than had the Ionian Greeks (Allbutt, p. 219). Heraclitus's animating fire was "something between air and flame, penetrating and vitalizing everything," something subtler than animating fire. Straton a later member of the school of Aristotle "held that the spirit was carried in by the semen." And so says Allbutt, "the idea of combustion was lost."

It must be understood distinctly that the heart conveyed no propelling motion to the two bloods. It was clear that it was subject to motion, but the motion was bellows-like, a motion of sucking in, what would now be called a motion of active diastole. It was not the function of this motion to propel blood to the periphery, but to draw blood into its cavities, to churn and to agitate it as might be done in a mixing chamber. How little motion was conceived to be conveyed to the blood, its heat and spirits, and how little desirable this motion was regarded to be is gained from the opinion of Dr. Thomas Winston (1575–1655) Professor of Physic at Gresham College who feared these, i.e. blood, heat and spirits, might "be broken with continuall motion."

The motion of the blood was, as has been said, slow and tide-like. Actually small quantities only moved, drops or the fractions of drops as Riolanus supposed. In one's waking hours it moved out toward the periphery and back again to the heart during sleep. This motion was actually retained by Caesalpinus, he whom the Italians credit with the discovery of what is now called the circulation.

The double vascular system which has been described gave rise to two divergent views, those respectively of Aristotle and of Galen. In Aristotle's scheme the heart was the center of the physiological mechanism; here arteries and veins both took their origin and to the heart both bloods were returned, once a day as Empedocles taught, each to its appropriate side. The parallel system resulted from the bilateral formation of the body. There were no anastomoses; there was as yet no great elaboration of the system of the spirits. To Galen, this arrangement seemed impossible; it permitted entrance from, though there could be no return of blood to the venae cavae once it became trapped by the tricuspid valve. The small quantity of blood which passed through this orifice and on into the pulmonary artery could be accounted for—it served a purpose. But the major portion was believed not to enter the heart. Galen regarded the liver as the center and source of the vascular system and the originator of the blood. He took into consideration, furthermore, that the portal system led to the liver, so that three rather than two vascular systems met here—obviously a more important resort than the heart. These divergent views were still living issues in the first quarter of the seventeenth century; physicians were divided into two camps ranged one with Aristotle, the other with Galen. It was the famous conflict between the philosophers and the physicians in which the philosophers, gallantly lead by Harvey finally won. This controversy gives meaning to Harvey's statement in his letter to Slegel: "It was proper that the dean of the College of Paris should keep the medicine of Galen in repair; and should admit no novelties into his school without the utmost winnowing." Riolanus was dean in Paris, and Paris was for the camp of Galen.

So far the two bloods, arterial and venous have been described as being quite different and having no method of intercommunication. In point of fact, each was thought to exhibit in slight degree characteristic properties of the other, as if we should say both contained appropriate concentrations of oxygen and carbon dioxide. Communications were in fact believed to exist, at the periphery, in the heart, and in the lungs. Erasistratus because the arteries were empty after death, regarded them as containing only spirits during life. But he noticed that when an artery was punctured it bled; he wisely concluded that somehow, blood passed from the veins wherein it was contained to the arteries from which it flowed and therefore he invented anastomoses, structures which remained respectable parts of anatomy until Harvey dealt away with them. These anastomoses must not be confused with those of a later time, for in them blood flowed in two directions, like a tide. That the arteries actually contained blood was demonstrated by Galen in many experiments. In his most famous one he trapped blood between two ligatures; on being incised it was obvious that the artery contained blood. Through the septum of the heart also, blood passed by small invisible and tortuous pores to be elaborated in the left ventricle into vital spirits. The septal passage also was Galen's suggestion. Finally an interchange of blood in the lungs was regarded as necessary, for blood certainly passed from the venae cavae into the right ventricle and thence into the lungs where the natural passed through the first stage of elaboration into vital spirits. But since the pulmonary valves prevented its return, this blood small in amount perforce flowed onward into the pulmonary veins, squeezed into them by the collapse of the lungs. Galen's plan came perilously near that proposed by Servetus and Columbus.

To the lungs themselves, the ancients, the moderns and Harvey himself attributed four distinct functions. First they were presumed to aid in maintaining the tide of the blood by their rise and fall. In the second place, from the air, they *admitted* substances essential to life; while the blood brought to them by the pulmonary veins, *discharged* through them fuliginous vapours, excrementitious in nature. These veins provided a possible channel because the mitral valve formed of two only instead of three cusps was, so Galen believed, imperfect. The blood flowed here therefore in two directions. But the third was the most important; it was the office of the lungs to ventilate and to cool the blood, warmed sometimes to boiling by the innate heat of the heart. Aside from these three functions, the lungs protected the heart—that most important of all the organs, the very centre of life itself. Finally the lungs shared with the heart, the coction, the elaboration of the vital spirits.

Beyond the facts of anatomy already discovered, the ancients were confronted with a number of phenomena which challenged explanation. They inferred from crude experiment that breathing was essential to life, was perhaps the source of life itself. And they knew other things. They knew for example that the heart tapped against the chest wall; they knew that the heart was muscular; they knew that the valves of the heart functioned; they knew that the arteries pulsated; they knew that arteries and veins were connected with the heart and that the arteries and veins contained blood different in color—truly a bewildering array of facts. One must read Galen to appreciate the excellence of the system he instituted, its internal coherence, its consideration of all these and other matters including the change from fetal to the post embryonic circulation. Beside problems obviously connected with the circulation they were puzzled, as I have said, by the problem of animal heat. That heat was necessary, they surmised, for was it not a commonplace observation that when alive the body was warm, but cold when dead. A probable locus for the generation and storage of the innate heat they knew must exist. What more natural than that the heart should be selected for this purpose. Its location and vascular connections suggested its choice as the most convenient source from which to distribute heat; the heart presented the advantage moreover of close proximity to the lungs, where it could be cooled and tempered. Their choice was wise and has been justified by time.

Let those who never theorize beyond the facts criticize these ancient conclusions or regard their authors as ignorant or merely perverse. Was it not Galen who in his own life, put blood into the arteries, saw that the heart is muscular, recognized the function of the valves, though when convenient in debate, he conceived their closures to be imperfect; recognized the difficulty of tidal flow in the veins and right ventricle in the face of a competent tricuspid valve? He had moreover to see to it that spirits both natural and vital were finally conveyed to the left ventricle. And in order to perform this feat was he not obliged to invent pores in the septum; much as Harvey later invented pores in the lungs and flesh; a supposition which Malpighi later established as a fact. Nor at the mention of his name should I fail to recall that we are this year celebrating another tercentenary, that namely of the birth of the ingenious Malpighi himself.

It is to the lasting honor of Vesalius that on the assurance of his senses, he cured the heart of this Galenic defect of the septum and by so doing set the stage for a new scene. After Vesalius a new pathway from veins to arteries had of necessity to be found. Had Galen known the valves of the veins, the one significant structure added after his time to the stock of knowledge, what use he would have made of them is an interesting speculation. Original and bold, he would surely have felt himself compelled to introduce them into his system. He might have failed in making the great discovery, but how many of the necessary data he had in hand! Galen himself has illuminating remarks to make on the conditions which govern discovery. He like so many other questioners wondered as Dalton points out, why truth is often so long obscured by the errors of the past:

> One may naturally ask, [he inquires] how it is that men of so much intelligence could have maintained an opinion so contrary to the truth, since they must have had some plausible reason for their belief? To which I [i.e. Galen] reply that they have left on record in their writings the grounds on which their belief was founded; and these grounds, though plausible, are not sufficient. In such matters a frequent source of error is the following: Everything which comes under the cognizance of human intelligence is comprehended either through the senses or by the reason; and as there are many things of a physical nature which escape the senses, so our reason often fails to master those of a different kind. A sincere lover of the truth, therefore, should never withhold his assent from things plainly evident on account of others which are obscure, nor accept those which are doubtful for the sake of what is really known . . .

A profound saying this, circumstantially repeated by Harvey himself in the introduction to his "De Generatione," forever requiring reiteration in the pursuit of a mistress so plausible as Nature.

The contribution of Vesalius has already been mentioned. So has the rediscovery of the valves of the veins. Fabricius had as a matter of fact no real use for them. He was indeed inclined to believe that they protected the veins from rupture by impeding the tendency to a rapid downward flow of blood, a service which was performed in the arteries by their heavier coats. Fabricius, great as he was, was no Galen.

But the episode of the discovery of the pulmonary circuit requires more detailed consideration though there is reason to believe that its significance has been somewhat exaggerated. Harvey was familiar with the account Columbus gave of it in 1559 but does not mention the earlier one, rendered much more interesting on account of its theological bias, and published by Servetus in his "Restitutio Christianismi" (1553). To Harvey it was scarcely more important than Galen's speculation, for he says in a parenthesis in his letter to Slegel:

> . . . Riolanus uses his utmost efforts to oppose the passage of the blood into the left ventricle through the lungs, and brings it all hither through the septum, and so vaunts himself on having upset the very foundations of the Harveian circulation (although I have nowhere assumed such a basis for my doctrine; for there is a circulation in many red-blooded animals that have no lungs) [Sydenham p. 597].

Nevertheless by suggesting the pulmonary transit, contact between air and venous blood for partial purification was properly provided for. Incidentally as Professor Curtis remarks the Galenic defect of the imperfect mitral valve was cured. But neither Columbus nor Servetus did the Galenic system any real damage. In reality they strengthened it, for both continued to maintain that *a small portion only* of the venous blood passed the tricuspid valve, and moved onward to the left ventricle. The valves, by the change in direction of blood flow, became competent but the erroneous system was unshaken. The main portion of the venous blood still remained in the venae cavae outside the heart and continued there its tide-like career. The new system was small gain indeed since by rescuing the valves from incompetence the old system was apparently more firmly entrenched and the chance of discovering *the* circulation more definitely postponed. From the Galenic point of view the great gain was that the heart was still safe from the entrance of crude venous blood. Proof, indeed the very suggestion, was still to be made that the whole blood and not merely a small fraction of it, traversed the lungs.

Frazer dwells with much interest on the situation brought about by the writing of Servetus and Columbus and concludes justly:

> All these anatomists have been credited, at one time or another, with knowledge of the circulation, but if we turn to their accounts of the veins and liver—a very good test of their views—it is found that they were all quite innocent of any conception of the circulation . . . In all these cases the passage through the lungs, which had been postulated by Galen, was simply adopted to supply the left heart with the material for its manufacture of "vital spirits," the perforations in the septum having lost caste with most writers.

Certain it is that the method, the temper, the character of the intellect displayed in the writings of Harvey are in such sharp contrast to those of his forerunners as to introduce the student of his treatise into a new world. His is no longer the vague unsatisfying recital of incompletely observed events, but the firm and thorough description of a genuinely accurate observer. I omit all mention of Caesalpinus who, though interesting in himself, and no doubt entitled to some credit in the history of this matter, seems to have played no part in Harvey's discovery.

It is time to return to Harvey and to an analysis of his reasons for dissatisfaction with the inherited beliefs. There are, so far as they are known to me, three sources of information which suggest whence the hint came to Harvey that the blood actually circulates. According to Sir Norman Moore, the dawn of the idea is to be inferred from a note in his own "Prelectiones" in which Harvey himself attributed to Aristotle the suggestion that led to his proof. The second, I take from the Honourable Robert Boyle:

> And I remember, [writes Boyle] that when I asked our famous *Harvey*, in the only Discourse I had with him, (which was but a while before he dyed) What were the things that induc'd him to think of a *Circulation of the Blood*? He answer'd me, that when he took notice that the Valves of the Veins of so many several Parts of the Body, were so Plac'd that they gave free passage to the Blood Towards the Heart, but oppos'd the passage of the Venal Blood the Contrary way: He was invited to imagine, that so Provident a Cause as Nature had not so Plac'd so many Valves without Design: and no Design seem'd more probable, than That, since the Blood could not well, because of the interposing valves, be sent by the Veins to the Limbs; it should be Sent through the Arteries, and return through the Veins, whose Valves did not oppose its course that way.

The third source is Harvey himself in the introduction to his book, where the reason assigned in his conversation with Boyle is, most curiously, omitted. He dwelt first and also longest on the error then current that the pulse and the respiration served identical ends " . . .

whether with reference to purpose or to motion, comporting themselves alike." Of this belief he disposed by showing that lungs and heart were strikingly different in structure, and that the arteries never contained air. The older authors were furthermore in contradiction with one another on all important points. Second, he found it impossible to believe that the heart, arteries and veins all beat synchronously and that the wave of the pulse passed, as Galen supposed, along the wall, rather than along the fluid column. Third, he could not conceive why different functions should be assigned to the two ventricles, the left only to elaborate vital spirits. Fourth, he could not see why, whenever it suited the argument, anatomists declared the four great cardiac valves to be permeable and especially the mitral valve which was permitted to pass fuliginous vapours but not the vital spirits. Fifth, he was overwhelmed by the variety of functions assigned to the weak-walled pulmonary veins as against the stronger pulmonary artery, and was especially concerned about the to and fro motions of the blood which the systems then current postulated must take place within its walls. Sixth and finally, he saw no reason for maintaining the existence of the pores of the septum, when in the first place they could not be found and in the second, when motion through them was conceived to pass only from right to left and never in the contrary direction. To Harvey, writing before the days of Stephen Hales, this seemed an irrational position. This list of objections clearly bristles with formidable difficulties. Harvey's acumen in marshalling its items raises him at once far above the level of his contemporaries. Having given sufficient reasons for embarking upon his undertaking, one the more necessary to him because "Hieronymus Fabricius of Aquapendente, although he has accurately and learnedly delineated almost every one of the several parts of animals in a special work has left the heart alone untouched," and having stated that he had almost, like Fracastorius, resigned an understanding of this organ to God, he launched out upon his great demonstration.

The argument, continued through seventeen short chapters, begins simply enough but accumulates force until at the end it becomes overwhelming. Whereas his predecessors had assigned to the blood, the sort of motion it should theoretically exhibit, Harvey proceeded differently. He studied the heart itself, not in one animal, but in animals of many species. He looked at the heart (Chap. II), he removed it from the body, he held it in his hands. He saw that its great function was to contract, that when doing so it became smaller, harder and paler, that by doing so it developed enough energy to expel blood. And then he noticed, great discovery, that the apex of the heart when in place, struck the chest, not in diastole as had been universally believed, but in systole. It followed logically that if, during systole, the ventricles discharged blood, the arteries must dilate, not as a bellows to draw in blood but like a glove into which something is forced (Chap. III). So perished the notion of the simultaneous contraction of heart, arteries and veins. A more detailed examination of the motions of the heart showed (Chap. IV) that auricles and ventricles also, contracted not synchronously. but in succession, four motions at two times, not four motions at four times, as Riolanus and Bauhin taught. He found evidence for this in the phenomena of the dying heart now so familiar, the *ultimum moriens* and the incomplete heart block of asphyxia. He proved furthermore that the auricles pumped blood into the ventricles. He saw, in the hen's egg, how "a drop of blood makes its appearance which palpitates, as Aristotle had already observed." He believed that the auricles, the last to die were also the first to live, the *primum vivens*. To the palpitating drop of blood we shall return. He found in short that the auricles contract first (Chap. v), send blood into the ventricles, and that these contract in turn. To drive home the kind of motion which he had in mind he resorted to two illustrations; first to firearms in which the mechanism is a chain of successive acts, trigger, flint and steel, spark, powder, flame, explosion, ball; and second to deglutition, to the passage of a morsel from the mouth through successive structures to the stomach. And in this connection he becomes a forerunner of Laënnec by mentioning in passing boldly and without ornament:

> When a horse drinks . . . the motion is accompanied by a sound . . . ; in the same way it is with each motion of the heart, . . . that a pulse takes place, can be heard within the chest. [In the next sentence he came to one of his important conclusions] . . . the one action of the heart is the transmission of the blood and its distribution, by means of the arteries, to the very extremities of the body, so that the pulse which we feel in the arteries is nothing more than the impulse of the blood derived from the heart.

This statement for its time was tremendous, not a mere revolution, but a genuine innovation.

Harvey's argument now forged forward. If what he had shown concerning the physiology of the heart was sound, why had it remained difficult, he asked, to recognize the rest of the mechanism devoted to a satisfactory blood flow. The answer was simplicity itself. It must be that the heart and lungs are crowded into such close contact, that it becomes difficult to observe what their topographical relations actually are. The pulmonary artery and the pulmonary veins are obviously short and are too soon lost in the substance of the lungs. This fact was his point of departure; he was now ready to discuss the pulmonary circuit. He described the difficulty of the ancients in searching for a passage from pulmonary artery to left ventricle. They searched for it consciously and conscientiously, just as his own countrymen searched for the North West passage. Finding none, they necessarily invented pores through the septum. But there were no pores, and there were theoretical objections anyway against their existence.

Harvey sought the pathway by other methods. He resorted to comparative anatomy and found in amphibians and reptiles, which had lungs, and in fish which had one ventricle but no lungs, what he wanted. What he found was that blood flowed from veins to arteries *through the heart;* the heart itself was the sought for corridor. And so the physiological North West passage was discovered, a quite different proof from Servetus! For the same purpose he examined embryos, and found the same thing. Blood passed from the veins into the right ventricle, then through the foramen ovale and the ductus arteriosus directly into the aorta, obviously *not* through the lungs. He next asked if this passage exists when the lungs are absent, why does it not do so when they are present and also in use?

To show that this might be so, he relied on argument by analogy; water for example percolated through the earth, it percolated through the skin, and large quantities taken at spas were known to pass through the parenchyma of the liver and kidneys. If passage through these was possible, why might not blood percolate through the more spongy tissues of the lungs. There was another point which made this passage even more credible, for the liver being at rest exercised no propelling force on the blood, whereas the lungs, through their constant motion were capable of doing so. This was what Columbus thought, this was what Harvey also thought. But for those "who admit nothing unless upon authority," he introduced a passage from Galen which states that the blood *may* so pass and "that this is effected by the ceaseless pulsation of the heart and the motions of the lungs in breathing" (Sydenham, p. 42). Harvey summarizes this and several other passages by saying:

> From Galen, however, that great man, that father of physicians, it clearly appears that the blood passes through the lungs from the pulmonary artery into the minute branches of the pulmonary veins, urged to this both by the pulses of the heart and by the motions of the lungs and thorax [Sydenham p. 44].

The proof of the pulmonary circuit rests then on evidence gathered from comparative anatomy, from dissection of the fetus and on the inference that what is true of the fetus is also true of the adult, except that the way of the blood after birth is not direct from ventricle to ventricle, but indirect through the lungs. The left ventricle suffices "for the distribution of the blood over the body . . . the right is made for the sake of the lungs, and for the transmission of the blood through them, not for their nutrition." Both ventricles have the same, not different functions. And so perished another ancient concept. Having settled the problem of the pulmonary passage Harvey was ready to write his celebrated Eighth Chapter.

The argument had proceeded so far by simple demonstration or on the authority of Galen or of Columbus. But "when" said he "I surveyed my mass of evidence, whether derived from vivisections, and my various reflections on them" and when furthermore he analyzed the heart, its valves, and its vascular attachments and when, as he says:

> I frequently and seriously bethought me, and long revolved in my mind, what might be the quantity of blood which was transmitted, in how short a time its passage might be effected and the like . . . I began to think whether there might not be A MOTION, AS IT WERE, IN A CIRCLE.

This was the point, out at last, to which he had been leading. The heart was truly a tremendous organ "the beginning of life; the sun of the microcosm, even as the sun in his turn might well be designated the heart of the world."

Harvey had now to coordinate his several cardinal ideas; the assumption about the circular motion, the province of the heart, the difference between arteries and veins in structure and function, and to proceed to the proof. The argument now became simpler and swifter. He had just spoken of "the quantity of blood which was transmitted;" quantity was the chief consideration in his proof or the one at least which apparently attained the greatest prominence in his mind. The use of quantity was new in physiology. One cannot avoid the insistent question: Did he learn the method in Padua or was it the result of his own devices? Without doubt the method was in the air, for Borelli, who developed it one might say almost too well, was already twenty years old when Harvey published his treatise. Harvey argued as follows: If the left ventricle post mortem contains two ounces when dilated, and of course much less when contracted, and expels from a fourth to an eighth of this, i.e. something between a drachm and a half ounce, then the total expelled in a half hour would range from ten and a half to forty-one and a half pounds. Were it the case of a sheep or dog, a scruple would be expelled, which would amount to three and a half pounds—more in both cases than the whole body contains. These, as later calculations have shown are relatively small quantities but obviously they are quantities which could not have been ingested nor could they have been drawn from the veins; there can be no escape therefore on this ground alone from the conclusion that the blood circulates. Although he believed there was usually great constancy in the volume output, this changed according to age, temperament, sleep, rest, food, exercise and affections of the mind.

It had now been adequately demonstrated that blood passed from veins to arteries by way of heart and lungs. It was necessary next to show that the circuit was completed *at the periphery* by the reverse passage, from arteries to veins. From the fact that the body could be drained of blood by dividing an artery, a fact well known to Galen and even to Erasistratus, the conclusion had been drawn that anastomoses existed.

That the blood leaves the heart by the arteries and returns to it by the veins and "that the blood passes from the arteries into the veins, and not from the veins into the arteries, and that there is either an anastomosis of the two orders of vessels, or pores in the flesh and solid parts generally that are permeable to blood," (Sydenham p. 58), Harvey proved by the famous experiment with tight and middle tight ligatures about the arms. First, with *tight* ones, flow into the arms through the arteries was blocked; these became distended above, while below pulsation ceased. Flow in the veins was also blocked. There was consequently no flow in and no flow out of the extremity. Second, with a *moderatetly tight one*, matters were different; the arteries continued to pulsate, but the veins now were distended below. When this ligature was undone, the individual experienced a somewhat cold feeling making its way upward. Third, if a *tight ligature was loosened* and the artery palpated, "the blood will be felt to glide through" and the individual experienced a sensation of warmth. Obviously then blood flowed into the arm through the arteries, and out through the veins. Fourth, that blood flowed from the arteries into the veins was proved by studying the case of the moderately tight ligature when pulsation of the arteries persisted, that is to say, when blood still entered but was prevented from flowing out of the arm so that the veins swelled below the ligature. All this quoth Harvey resulted from "the forcing power of the heart" and not at all from heat, pain, or *vis vacui*. There was surely then a passage from arteries to veins.

Harvey next employed the striking proof derived from his study of the venous valves, the one he communicated to Boyle. "Their office" said he "is by no means explained when we are told that it is to hinder the blood, by its weight, from all flowing into inferior parts; for the edges of the valves in the jugular veins hang downward, and are so contrived that they prevent the blood from rising upwards." The valves all look "invariably towards the seat of the heart." As a matter of fact he believed that "the valves are solely made and instituted lest the blood should pass from the greater into the lesser veins." He arrived at this belief from his effort to pass probes, which were uniformly blocked when directed from centre to periphery. This observation led him on to the four beautiful experiments on the superficial veins of the arm. Lay on a moderately tight ligature. Press one index finger upon a vein and with the other index finger stroke the vein upward to the next valve. You will see first that the interval becomes empty and second that it cannot be filled from above, even by stroking downward; the valve you will learn is tight. Then came the third phase; if you lift the compressing finger, blood flows into the empty vein, not from above, but you may be quite sure, from below. Finally if you repeat the first phase, that is to say, compressing and stroking upwards, one thousand times in succession and estimate the quantity of blood so allowed to pass upward, "you will find that so much blood has passed through a certain portion of the vessel; and I do now believe that you will find yourself convinced of the circulation of the blood, and of its rapid motion" (Sydenham, p. 67).

Harvey must now be permitted to summarize his case:

> Since all things, both argument and ocular demonstration, show that the blood passes through the lungs and heart by the action of the (auricles and) ventricles, and is sent for distribution to all parts of the body, where it makes its way into the veins and pores of the flesh, and then flows by the veins from the circumference on every side to the centre, from the lesser to the greater veins, and is by them finally discharged into the vena cava and right auricle of the heart, and this in such quantity or in such flux and reflux thither by the arteries, hither by the veins, as cannot possibly be supplied by the ingesta, and is much greater than can be required for mere purposes of nutrition; it is absolutely necessary to conclude that the blood in the animal body is impelled in a circle, and is in a state of ceaseless motion; that this is the act or function which the heart performs by means of its pulse; and that it is the sole and only end of the motion and contraction of the heart [Sydenham, p. 68].

The formal demonstration was now complete. Harvey had brought to light the function of the heart and its dominant place in the circulation of the blood. But from his own point of view his task was not yet finished. Traditional physiology ascribed other activities to the heart to which he was obliged also to turn his attention. In tracing their origin and in appraising the meaning of them it is a great pleasure to me to acknowledge the guiding hand of my own teacher in physiology, Professor John G. Curtis, whose book "Harvey's Views on the Use of the Circulation of the Blood" prepared after his death with rare devotion and judgment by Professor Lee, is I may say, I hope without exaggeration, the most scholarly and penetrating study of Harvey's thought which has so far been undertaken.

These other functions, Harvey turned then to consider. The primacy of the heart as against the blood, of the blood as against the heart, this old Aristotle-Galen controversy Harvey could not dismiss, even from a treatise so mechanistically conceived as his "De Motu Cordis." He felt obliged to consider:

> Wherefore does it [that is the heart] first acquire consistency, and appear to possess life, motion, sense, before any other part of the body is perfected, as Aristotle says in his third book, De partibus Animalium? And so also of the blood: Wherefore does it precede all the rest? And in what way does it possess the vital and animal principle? And show a tendency to motion, and to be impelled hither and thither, the end for which the heart appears to be made? [Sydenham, p. 74].

This was one of the questions about which his views fluctuated, as many references that might be cited show, both in "De Motu Cordis" and in "De Generatione." But against Galen he takes his place definitely beside Aristotle:

> Nor are we the less to agree with Aristotle in regard to the sovereignty of the heart; nor are we to inquire whether it receives sense and motion from the brain? whether blood from the liver? whether it be the origin of the veins and of the blood? and more of the same description. They who affirm these propositions against Aristotle, overlook, or do not rightly understand the principal argument, to the effect that the heart is the first part which exists, and that it contains within itself blood, life, sensation, motion, before either the brain or the liver were in being, or had appeared distinctly, or, at all events, before they could perform any function. The heart, ready furnished with its proper organs of motion, like a kind of internal creature, is of a date anterior to the body: first formed, nature willed that it should afterwards fashion, nourish, preserve, complete the entire animal, as its work and dwelling place: the heart, like the prince in a kingdom, in whose hands lie the chief and highest authority, rules over all; it is the original and foundation from which all power is derived, on which all power depends in the animal body [Sydenham, p. 83].

There can be no doubt that Harvey was a confirmed Aristotelian. Did he not say in his old age " . . . the authority of Aristotle has always such weight with me that I never think of differing from him inconsiderately." He will appear in the end, however, in "De Generatione" to have indicated his preference for the blood as the prime mover, deducing his proof from the hibernation of certain animals, and of others with blood but without a pulse (Sydenham, p. 76, lines 11–29 and p. 374, lines 28–35). The attribution of primacy to the blood is not however, to be viewed as a capitulation to Galen. Mechanically the heart had been immovably entrenched.

Although formulated later than his treatise of 1628, Harvey's view of the cause of the heartbeat is interesting and in a sense completes his account of the mechanism of the heart's motion. He says " . . . I view the native or innate heat as the common instrument of every function, the prime cause of the pulse among the rest. This however, I do not mean to state absolutely, but only propose it by way of thesis" (Sydenham, p.

138). By swelling rhythmically at the caval entrance, the auricles and then the rest of the motion of the heartbeat is set into action. It is as Curtis says: "the Harveian heart beat is caused and initiated by an Aristotelian swelling up of the hot blood" (Curtis, p. 90). Harvey forgot a fact that he himself had adduced, namely, that fragments of muscle and the empty heart even when taken outside the body may both contract rhythmically (Sydenham, p. 28).

In discussing the pulmonary circuit of the blood it will be remembered that Harvey put the function of the respiration aside, as a subject apart from his present problem. To learn his later views his other writings must be consulted. The idea of the cooling and tempering effect of the inspired air on the innate heat when taken into the blood and the heart he inherited from Hippocrates, from Aristotle and from Galen. Aristotle had been at pains to indicate how this was accomplished. He believed that the branches of the trachea were disposed so that they lay parallel in the lungs with the pulmonary vessels and that they held this position because " . . . no common (communicating) channel exists, for it is by contact that they receive the breath and transmit it to the heart." (Curtis, p. 15, Aristotle, History of Animals, 496a, 27–32.) This doctrine of cooling Harvey accepted at first. There was a second ancient doctrine, Galenic rather than Aristotelian which stated that the air or that part of it which entered the lungs was worked up, or concocted there first, next in the heart, and in the arteries with that air in addition which permeates the skin, and finally with a fresh supply of air in the *rete mirabile* at the base of the brain. This substance became *vital* spirits in the lungs and heart and animal or psychic spirits in the brain. Natural spirits brought from the right heart by the pulmonary artery to the lungs received there their first refinement. It was precisely in discovering that the pulmonary circuit served this function of bringing blood to the lungs to be concocted, wherein Columbus's achievement consisted.

At first Harvey accepted both these doctrines; the doctrine of cooling and the doctrine of concoction, which we now call oxidation. The doctrine of concoction he came later to deny although it had had adherents for two thousand years and was again adopted soon after his death by Lower. His denial should however be credited to Harvey as a virtue, for relying as he did on the senses, he could adduce no evidence in favor of this mechanism. He could find air neither in the pulmonary artery nor in the left ventricle even after blowing up the lungs of a dog with a bellows. The difference in color between arterial and venous blood which should have aided him he knew. It would be said now to be as good a guide to the function of oxidation as were the venous valves to the existence of the circulation. He knew the difference, indeed it had long been known, but he chose to ignore it as being slight and of no account. He came to this conclusion reluctantly because both bloods retained the same volume and assumed an identical color soon after being shed. Of the meaning and origin of spirits he came finally to have doubt. "Spirits" Harvey concluded are "not from the air" (Curtis, p. 34). In his old age he came to deny even the cooling effects of the air:

> If any one will carefully attend to these circumstances, and consider a little more closely the nature of air, he will, I think, allow that air is given neither for the "cooling" nor the nutrition of animals; for it is an established fact, that if the foetus has once respired, it may be more quickly suffocated than if it had been entirely excluded from the air . . . As arguments on either side are very equally balanced, it is a question of the greatest difficulty [Sydenham, p. 530].

And so the matter ended, without decision. He tried out the theories of the ancients and found them wanting. Unlike the one into which the capillaries later fitted, he recognized no new assumption concerning the respiration that he could make either in regulating the temperature or in providing a mechanism for oxidation.

Harvey's work was done. He had been inducted into the anatomical tradition at Cambridge, he became absorbed in anatomical problems at Padua, he practised anatomical investigation in London. Throughout his life he was devoted to a problem, interest in which began in Greece, and was transferred successively to Alexandria, to Pergamon, to Paris and to Padua, in the end to come upon its final study and solution in England. It was the outstanding physiological problem of the classical world. This he inherited as all scientists inherit their problems except that in this case knowledge had already attained advanced development. He absorbed and mastered its entire literature and he unravelled completely its intricate nature. Its complexity was not less great than the problem studied by Kepler; Harvey too was required to deal with many factors incredibly difficult to understand. To each he gave new functions, ordered them all in a simplified organism and achieved a synthesis not only unified but esthetically satisfying.

What Harvey achieved is acknowledged by universal assent to be the foundation for further development. Whether that development necessarily sprang from what he actually accomplished is more doubtful. From the oft repeated statement that this discovery began a new era in physiology, it seems necessary to dissent. Nutrition and respiration became the outstanding subjects of investigation in the new era. The birth of psychology has been delayed until our own day. The study of the respiration remained deadlocked even though Lower eight years after Harvey's death found the clue here to the difference in the color of the two bloods. A complete solution necessarily awaited the satisfactory development and appreciation of chemistry. This way Mayow lighted, though the leaders of the Royal Society failed to see it. Then the vogue of Stahl completely obscured it. Van Helmont and Black, Priestley and Lavoisier one hundred and fifty years after the publication of "De Motu Cordis" finally discovered it and followed along Mayow's way. Lavoisier saw the way chemically at once, but it was even later that oxidation was transferred from the lungs to the tissues. Then it was that the long inquiry terminated, so checkered in its course from Aristotle and Hippocrates to Galen, from Galen to Harvey, from Harvey to Lower. This is not the history characteristic of a discovery that initiates a new era. It is more just to regard Harvey's great achievement as the close, not the beginning of a period. He stands, not in time but in thought, midway between the ancient and the modern worlds.

No one who is in a moderate degree historically minded and interested in the evolution of the human intellect can escape reflecting on, and attempting to appraise Harvey's place in the scientific movement of the Renaissance. I find myself adhering quite naturally to a statement Mr. H. O. Taylor recently made:

> We bear in mind that physical science, and each branch of it, is a unity and a whole, made of its present and its past; so that the history of any science is verily that science itself in its entirety and continuous course from its beginning to what it is now and hereafter shall come to be.

No clearer example than Harvey can be furnished in evidence of this conception; he has himself amply demonstrated its truth in the course of his own writings. He summed up in its entirety the history of his science. Of his relation to his contemporaries of the seventeenth century it is more difficult to speak. The record is lamentably vague. What there is of it gives the impression of a far greater continuity with the past than of intimate sympathy with his own world. His ever present intellectual companions were Aristotle and Galen. His correspondence, so much of it as has been preserved is exasperatingly slight. In his writings there is no mention of a single contemporary English author, certainly a remarkable fact at the end of the age of Elizabeth. The single poetical quotation in "De Motu Cordis" is taken from Terence. That with men like Winston, Professor of Physic at Gresham College, he had little basis for companionship is no surprise. But Gilbert was still alive when he returned from Padua and the group of inquiring intellects, Hooke, Wren, Boyle, Petty, which formed the Royal Society three years after his death had been actively gathering during the last seventeen years of his life at meetings centered around Gresham College, at the time the most interesting experiment in scientific education. With none of these men does he seem to have established relations of friendship, but rather with Thomas Hobbes who attacked them as anti-Aristotelians. Robert Boyle, that extraordinarily curious and inquiring mind, met him only once and that shortly before Harvey's death, when Boyle was already thirty years old. There was no companionship that is traceable now which can be said to have been stimulating or to have influenced significantly the course of his thought. He must have been a person singularly devoted to his special interests, little concerned with the problems of the scientific world that surrounded him. Of chemists, and of chemistry, Aubrey tells us that he held a poor opinion. And of Galilei, who was making Padua alive with curiosity in subjects of really great general concern, and whose lecture room adjoined that of Fabricius so that Harvey could scarcely have escaped seeing him, we catch no echo in his writing. There is no reason to believe that what Galilei had to say had much interest for him, although many an Englishman on his grand tour must have sought him out as had John Milton. He was unsympathetic to Galilei as later to Aselli: ". . . no kind of science can possibly flow" said Harvey "save from some preexisting knowledge of more obvious things; *and this is one main reason why our science in regard to the nature of celestial bodies, is so uncertain and conjectural.*" There is indeed an animadversion against the new astronomy in that same treatise in which he says "and there are persons who will not be content to take up with a new system, unless it explains everything, as in astronomy" (Sydenham p. 123). When in point of fact Harvey turned away from anatomy to find a metaphor for the circle in which the blood travels, he turned not to the new science but back to Aristotle and remarked: "Which motion we may be allowed to call circular, in the same way as Aristotle says that the air and the rain emulate the circular motion of the superior bodies; . . . " (Sydenham p. 46). For mathematics, however, he developed a deep interest, especially in his declining years. He mastered Oughtred's "Clavis Mathematicae" and was working problems from it not long before he died.

There are those who profess not to rate high this achievement of Harvey. It lacks experimental elaborateness and the complicated and dazzling procedures of the modern laboratory. But if he is the great scientist who possesses a capacious mind, who sees his problem and who sees it whole, who bends his energy to its solution and who in his demonstration exhibits that fine esthetic quality which restrains exuberance and limits his proof to what is relevant, then I have no hesitation in linking the name of Harvey with that enviable company of which Kepler and Newton, Lamarck and Darwin are the shining examples.

I have come to the end of my analysis. It has been the record of a great history in which the intellectual giants of the race have taken their part. Neither Aristotle nor Galen needs my praise. But although not the heroes of my story, I am reluctant to part company with them without dwelling on the distinction of their contributions to the ultimate solution of this problem. The more theirs appear to be internally coherent, the greater is the credit due to Harvey who saw that what he received from them was a thing of fragments. He inherited a heart which did not work, anastomoses which did not exist, pores in the ventricular septum which would not die, vessels which knew no consistency of motion. Into the heart he breathed energy, into the vascular system order. One, certainly, of the most complex mechanisms in nature attained in his capacious intellect completely harmonious arrangement. To have brought about this innovation represents one of the great somersaults in the history of the human understanding.

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THE APPRECIATION OF THE MEDICAL PROFESSION AND THE DIVINE ORIGIN OF MEDICINE*

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WHEN recovering from some serious illness or on shaking off some prolonged physical torture, every sensitive person must feel his recovery as something divine. Poets and philosophers of all times have praised health as the greatest of earthly blessings. The art of restoring it when it has left man, medical art, was considered in ancient paganism and is even regarded in Christianity as of divine origin. Apollo, son of Zeus, was the healing god, who conferred his art which consisted not only in restoring the sick to health but also in raising the dead, on his son Aesculapius. Zeus, who was of the opinion that once a man had reached Hades he ought to remain there, killed Aesculapius with a thunderbolt and then at the request of Apollo placed him in the sky as a constellation. According to the Old Testament,[1] the Lord proclaimed on Mount Sinai: "I kill, and I make alive; I wound, and I heal." Talmudical fatalism makes the physician who comes at the call of the sick a messenger of the Lord, the executor of the divine will.[2] The New Testament teaches us that Jesus, when still unknown among men, chiefly gained their confidence and belief by curing the halt and the sick. He also conferred the gift of healing on his apostles.

Erasmus[3] recognizing the divine origin of medicine, allows its practitioners to share in his unbounded reverence for this art and holds that they have a claim to the infinite gratitude of their fellow creatures. Strange to say he does not stop to consider in how far those who practised this art really understood it and in what way they applied it to the benefit of humanity. And yet the great Rotterdam scholar was by no means wanting in clear insight. He considered the physician as a benevolent and gracious deity in the sense of the ancient Greek proverb: "One man is another man's god." He was also fully convinced of the doctors' claim to a plentiful financial remuneration for their services. He mentions a number of examples of extravagant payment given by princes to their doctors, but thinks that the greatest possible reward is still too small for him who has saved a man's life.

Jacob Cats,[4] the Dutch poet, who—a fact perhaps unique in the history of literature—is still after three hundred years invariably called by the name of "father" by his people, was like Erasmus an ardent admirer of medical art, and he too wished the doctors to be rewarded as they deserved:

Hail, hail, ingenious folk, success attend your ways!
May fortune send you gold and not mere empty praise!

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* The author was three times the president of the Netherland Medical Association and on each of these occasions delivered a presidential address discussing the position of the medical profession and the physician's task. The present paper is a translation of the last of these three addresses (Middelburg, 1925). Some parts of the former addresses have been inserted; parts of mere local significance have been omitted.

His contemporary Constantyn Huygens[5] was less enthusiastic if I mistake not. I have found among his poems a satire on "An Ignorant Physician," whom he calls:

A treacherous bridge across which whoso goes
May fall in the canal and drown or wet his clothes;
The cities' broom, a scythe of reaper Death,
Incomprehensive cask that holds less than it gives,
A waster of his words, who spends more than he has.

Then the poet introduces a doctor who gabbles a lot of apothecary's Latin, and administers medicine to a patient who is not seriously ill, and comes to this conclusion:

Ye citizens behold such jabberers and fools
Worsen the malady and of death are the tools;
'Twere better if the sick were left to Nature's tending
Cared for by ignorant friends, safe from such doubtful mending.

A layman here expresses the sensible thought that many patients do not need medicine, but fresh air, and that Mother Nature may safely be entrusted with the curing of many indispositions.

This reminds me of the birth of Oliver Twist in a workhouse which has since become notorious all over the world. The newborn infant declined to breathe and hovered for some time between this world and the next. "If during this brief period Oliver had been surrounded by careful grandmothers, anxious aunts, experienced nurses and doctors of profound wisdom, he would most inevitably have been killed in no time. There being nobody by, however, Oliver and Nature fought out the point between them. The result was that, after a few struggles, Oliver breathed, sneezed and cried."

Yet Dickens did not scorn medicine, nor was he hostile to medical men. When after his death, the *British Medical Journal* praised the rare fidelity with which disease and death are described in his novels,[6] it acknowledged at the same time with gratitude that "he was always just, and generally generous to our profession, so that we ourselves could well afford to laugh with the man who sometimes laughed at us, but laughed only as one who loved us."

There is not a social group that is more generally ridiculed than that of professors or that of doctors. The laughers make a difference, however, in their attitude towards these two classes. The professor is laughed at as the personification of absentmindedness, awkwardness and unfitness for real life. But the thought that lies at the bottom of all this goodnatured and cheap mockery is after all the recognition of the scientific minds of these gentlemen. For the professor who, when coming home late at night, puts his wet umbrella in bed beside his wife and himself in the umbrella-stand, commits these and similar absurdities because his mind is engaged on high scientific problems and after all this is his task in life.

When the doctor on the other hand is accused of absentmindedness and carelessness as he sometimes is, the blame for these errors of his cannot as in the case of the professor be taken as praise in disguise; in the man of practise it is an accusation of lack of seriousness and devotion. It is not likely that a doctor would be forgiven on the plea of absentmindedness for prescribing for a baby a dose fit for a horse or for muttering "eight, nine, ten, knave, queen, king, ace" while feeling a patient's pulse after having been called away from a game of cards.

More frequently than for inadvertency and heedlessness the doctor is blamed for not understanding his business, for making people ill instead of well, for sending them to the next world. When Frederick the Great was recovering from an illness and was asked how he was, he answered: "I am quite well again, notwithstanding two famous doctors having greatly exerted themselves on my account."

The doctor-poet Sir John Hill[7] had the following kind words addressed to him by a contemporary:

The worse that we wish thee for all thy vile crimes,
Is to take thine own physic, and read thine own rhymes.

Whereupon another grateful patient recommended inversion of the order, for if he were to take his own medicine first, he would never survive to read his own doggerel.[8]

How satirists think of us we have already learned from Huygens' comparison of the physician with the scythe of Death. The well-known caricature by Hogarth[9] simply represents us as "the guild of undertakers," and the same image is found everywhere, with a thousand variations, in picture and poetry and in conversation at the club table.[10]

All this injustice done to us we accept with a magnanimous smile, knowing that those very mockers will not fail to call in our help, when they fear danger for their own dear bodies or are anxious about those they love. La Bruyère expresses this thought very aptly in his dry way: *Tant que les hommes pourront mourir et qu'ils aimeront à vivre, le médecin sera raillé, mais payé.*

Besides our stupidity and the opposite effect of all our efforts, the medical profession still offers other delightful butts to facetious people. I mention the disagreement among members of the profession, which has been exposed, especially in old prints, in the form of violent quarrels, even blows, at medical consultations; also the cupidity of doctors, who are supposed to think little of the welfare of their patients, but to be only intent on lining their own purses.

It would be foolish for us to allow our humour to be spoiled by all this. We prefer to take comfort from the words of the wise Erasmus who observes that our profession has this in common with good princes, "that it acts well, but has a bad reputation."

The reputation of medicine, that is to say the appreciation of it by the public, has varied much in the course of time. Many people think that it has gone down in the last twenty-five years. Twelve years ago N. Van Rynberk[11] even spoke of "incipient deterioration," a lowering in general appreciation, as the two principal causes of which he indicated: 1. Increasing specialism, and (especially) 2. the changed spirit of the age, "the tendency to acknowledge material value only and, throughout society, to judge everything by a material standard." Indeed, judged by such a standard, our profession would never be able to maintain a very high social position. Croesuses, who show their gratitude for the salvation of their lives by paying fabulous sums, are very rare birds. The first-class family doctors and surgeons who earn great incomes are also much less numerous than is generally thought. On an average the pay for medical treatment is not in right proportion to the care and trouble and also the physical exertion it requires.

Bernard Shaw,[12] on the ground of the system of payment in private practice and also on account of the poverty of doctors (in England), considers the medical service of the community as a "murderous absurdity." The surgeon has a pecuniary interest in cutting off your leg. The more appalling the mutilation, the more the mutilator is paid. He who corrects the ingrowing toe-nail receives a few shillings, he who cuts out your inside receives hundreds of guineas, except when he does it to a poor person for practice. It is simply unscientific to allege or believe that doctors do not, under existing circumstances, perform unnecessary operations and manufacture and prolong lucrative illnesses. This is the gist of an argument for state socialism in medicine which, very long and greatly exaggerated though it is, will yet be found quite worth reading.

As far as the honour of our profession is concerned we need not take it too much to heart, seeing that the author expresses it as his opinion that (English) "doctors are just like other Englishmen: most of them have no honour and no conscience." But it is absolutely a matter of conscience. I cannot imagine that there should be many among us who would unnecessarily put their knives into a fellow creature. That there are some such is beyond doubt, however; we all know such specimens. The conscientious doctor is often hampered and restrained by the fear of giving too long or too frequent attendance to a patient, or even of being suspected of doing so. To me this seems a thorn in the side of private practice and I have always been of the opinion that in this respect the patients of my gratuitous polyclinic were in a better position.

With Van Rynberk I fear that the increasing materialistic view of life will be to the detriment of our profession, not so much because we may be judged too much by the standard of material prosperity, but because we ourselves may attach too much weight to such a standard. The demands which doctors, more particularly specialists, make of life are undeniably much higher than they were ten or twenty years ago. There is a connection between this and the nervous haste with which the younger ones among us try to secure remunerative work, while the respect which was formerly considered due to elder colleagues is not invariably paid to them now. Wistfully the older specialists remember their formerly gratuitous polyclinics, and how proud and pleased they felt when they were well visited. I am well aware of the different circumstances in which the younger among us live at present; but at the same time I also see in the spirit of the age, as such, a levelling power which tends to lower our profession.

Like priests, doctors serve mankind; the emblem of medicine must always be that which Nicolaas Tulp,[13] the burgomaster of Amsterdam (famous not only through Rembrandt) had chosen for himself, the burning candle, giving light to others, itself being consumed the while, *alias inserviendo consumor.*[14] Its reward must in the first consist in inner satisfaction at being able to contribute to the happiness of others. I do not deny that the choice of the medical career is often determined by its social prospects. Yet among those who have entered upon medical practice there will be comparatively few who do not feel the heavy personal responsibility for the life and health entrusted to their care. He who cannot set his own personality aside for the welfare of his patients ought to have chosen another useful occupation, for instance that of a shop keeper, an insurance broker or a banker.

That, at the same time, physicians must be able to make a living goes without saying. The public is inclined to reward the doctor's devotion with gratitude and affection and it sometimes dislikes the thought that hard cash has to seal its gratitude. Yet we are faced by undeniable necessity and the public is unreasonable in reproaching us with covetousness. Undoubtedly there are doctors whose principal thought is not the patient but the patient's purse. But then the same spirit is found among those who follow other vocations and it is unfair to judge the whole profession by this standard. There are also doctors, however, who find it difficult to make both ends meet, whose practice scarcely provides for the needs of their families and who yet, day in day out and year in year out, work harder than any one belonging to the so-called working classes. H. G. Wells,[15] who treats the question of the remuneration of medical servies in a more graceful fashion than Shaw, wisely puts his physicians who have been relieved of all earthly cares in an impossible world ("in that extravagant world of which I dream").[16] Indeed, our doctors are of this world notwithstanding the divine origin of their profession. If any man has a right to a decent income for himself and for his family it is certainly he who, as no other worker, is ready by day and by night to come to the assistance of those among his fellow creatures who are in need. In time of general danger such as a threatening rupture of a dike or a storm at sea, all bear a hand and a night is spent in labour and anxiety. But a doctor is called out of bed not one night but often night after night, always after a tiring day, in all seasons throughout the year. Where in the ranks of workers is the man who would share this task with the family doctor?

NICOLAAS TULP

Also when judging of the high fees of surgeons fairness commands us to take the circumstances into consideration. Their special training after the final examination requires at present several years; the duration of their highest efficiency is but short. This is not only due to the physical exertion their work entails but also to their anxiety even at night about their serious patients whose fate is in the balance of life and death, the scale of which may be turned by their personal actions.

There are limits however, the overstepping of which necessarily makes a painful impression on the public because it is evidence of a disproportion between the two important features of the medical profession, the divine and the earthly one. The divine side of it is served by the difference made by all doctors between the fees charged to the poor and to the rich. Not a right-minded doctor but pays attention to the financial strength of his patients, and who among us does not every day do a great deal of work, and with love, although knowing that it will remain unpaid. The divine side of the profession is violated by every ungraciousness to people with a lean purse.

If the earthly side of it comes to the fore, if it plays a part in the medical considerations of the physician, if the high principle of unequal payment is misused to bleed the rich man, in the figurative sense, then the doctor lowers himself to the level of the quack and his divine art to a dreary trade. I do not know if nowadays there is more sinning in this direction than formerly. It is certain that the esteem in which the public holds our profession greatly depends on the proportion of god and man or rather of the human and the inhuman in the majority of physicians.

The spirit of the age, or rather the changing social conditions, threaten our profession with yet another danger, the loss of our independence. I do not refer to the ever increasing group of medical officials. The work they do in the service not of suffering humanity but of the preventive medical art of the community, this work, taken as a whole is beyond our praise. I think that the muse of history when, after many years, it will look back on the period in which we are living now, will sing a song of praise to the profession whose serious endeavour it has been to make itself superfluous, for the public good.

I dread danger to our profession, and not without good reason, from the still unbalanced sense of power of rising democracy, which denies the divine factor in medicine and sees in the physician only a wageworker in its service. We must stand firm, shoulder to shoulder, in the defence of the liberty of our profession. Not a single social calling is so essentially hostile to the idea of the organised struggle of interests as medicine. But yet, however strange and out of place the doctor may feel in the class war, Aesculapius himself calls upon us to fight this danger. Priests as we are at his altar, it is unbearable for us to see a strange power push itself between us and our patients. In these levelling times there is no one that has remained more of a personality than the doctor. If the doctor's personality is eliminated, if nothing counts but his technical skill and his knowledge, medicine is lowered to the rank of veterinary art, an indispensable and noble profession, no doubt, but one that lacks the divine inspiration of medicine and one which the true physician can never desire for his own.

It is curious and highly disappointing, that a decrease in appreciation of the medical profession must be recorded at a time of unprecedented efflorescence of medical science. The progress of medicine in the last century is greater than that in all the preceding centuries put together. Since intuition, dogma and contemplation have made place for examination and experiment results have been obtained which our predecessors could not foresee in their wildest dreams. Dogmatic deduction has had to make way for the inductive method, which only acknowledges well-proved facts and which scrupulously tests its working hypotheses by all the newly discovered facts. Under this guidance medical art has, in the latter half of last century, developed into an experimental science.

In addition to physiology, pathological anatomy has steadily risen in importance. The first systematic dissections of dead bodies by Laënnec were followed by the Vienna school under Rokitanski; in particular however Virchow deserves attention, for it was his cellular pathology which replaced the dethroned humoral pathology. Thus medicine awoke after the dark night of dogmatism to a new and fresh life in the light of natural science. It began to speak in an entirely new language and, symbolically in the lecture-rooms, Latin made way for our beautiful terse mother tongue.

How much our views have changed and deepened since Virchow! His "anatomical thought," which led to a constant search for the "seat of the disease" has now for the greater part been superseded by the physiological conception of disturbed function. Medical thought is no longer chiefly governed by the anatomical changes of a particular organ, but rather by the altered relations in the whole sick organism.

Besides, the question of the cause of disease has very much come to the fore. Bacteriology is the tremendous revolutionary in the medical world of recent times. It has overturned almost everything. Passing through the stage of antisepsis it has given us aseptic treatment of wounds and has made Lister the greatest benefactor of his time. It has put an end to the dreadful childbed fever and has opened to surgery, and to the whole series of surgical specialisms, an endless field of useful occupation. It has given birth to serology and to the doctrine of immunity and has lovingly adopted the cruelly disowned nurslings of ancient medicine the *materia peccans* and the *vis medicatrix naturae,* now freed, however, from their former mysterious wrappings. It has presented us with the long desired causal therapy which, in its tender infancy, is already full of promise for the future. For Hygeia it has built in an original style, a new temple which is universally admired. Beside bacteriology, biochemistry has claimed the right to compete for the prize in the advance of medicine. Indeed the doctrine of internal secretion has already begun to play a leading part on the stage of biology, a part not only important because of the golden fruits it promises to therapy, but also exceedingly fascinating because it inspires us with ever deepening awe for the secret of human life which, from moment to moment, depends on the undisturbed balance of a number of exceedingly intricate chemical and physical processes which are constantly carried on in our organism, a balance which is kept up by compensations to a great extent still enigmatical.[17]

The scientific results obtained have also been widely applied to the benefit of suffering humanity. I will only mention, in passing, the statistics of disease and death-rates, to restrict myself to this one thing for which we can never be too grateful, the decrease of bodily suffering. This decrease is not in the first place due to the invention of a great number of anodynes, but much more to improved diagnosis and more efficient treatment, and chiefly to modern surgery which by a single painless operation insures health and energy to numbers of people who formerly had to drag a sickly body to the grave.

We ask with astonishment what can be the reason that with the growth of medical science public appreciation of our profession has not risen in a parallel line; why also to-day the multitude crowds round the eloquent quack and why even educated people, at the end of their wits, attend to the plausible words of the hypnotist. I cannot help thinking that this must be a sign that, deep down in the soul of the people, there lies the conviction that medical art is a divine gift which may exist and be beneficial without science or study. Such a conviction is not at all incomprehensible. We small Asclepiads are not Aesculapius himself. An effectual preventive of death is not yet in our possession.[18] Nature, the great healer, does not make any difference between quacks and experts, but the quack never omits to put the feather in his own cap when his merciful ally has effected a cure.

Moreover, the higher science has risen the more it has, in its pride, estranged the public from the doctor. When medical science moves from the sick bed to the laboratory, when instead of sick people diseases are treated, a powerful instrument slips from our grasp, which the quack handles in a masterly way: the personal influence of one man on another. Medicine, as such, is not natural science. There is too much humanity in her blood for that. The physician who fights at the sick bed for the life of his patient cannot confine himself within the narrow bounds of his science.[19] How often does it not happen that a decisive step must be taken without sufficient data! Every case is a problem with many unknowns, the psychological and also the personal part of which can be approximated, but can never be completely explained by science.

Besides, with the rapid increase of our experimental knowledge we do not allow ourselves time to think quietly. Immature and untested, the fruits of our science are put before the public. Constantly new laws of nature arise which after a brief existence make place for others, and yet nature has remained the same meanwhile. At presence immunology and endocrinology are struggling in such a period of storm and stress. Both promise great blessings to mankind. If it could however be stated in reliable figures in how far the application of these two both to the healthy and the sick has up to now been useful or harmful, what surprises such statistics might afford! In a time of furious ardour of discovery such as we live in now, we fight here and there in semi-darkness, with arms that we ourselves scarcely understand. Only when by and by the day breaks slowly and we can survey the battle-field will it appear which has suffered most from our zeal, the friend or the enemy. Roentgen-ray treatment is now just beginning to attain to the knowledge of right dosing. Serology is still far from knowing the exact amount and ratio of the good and the harmful effects of all the poisons daily administered. With as yet unsteady rudders the small crafts of sero- and organo-therapy dance on the sea of medical practice, not left alone by the lay public who read in the newspapers about every new invention and insist on being injected against all their real and imaginary diseases with miraculous medicine from small, fused-up glass tubes. From the too-calm sea of therapeutic nihilism we have again emerged on to a current of polypharmacy. Hormotone and such like, and the multivalent sera strongly remind one of the complicated prescriptions of our forefathers.

The principal factor which determines the estimation in which our profession is held, the real value of the physicians, I have kept to the last. Given sufficient knowledge, common sense, interest and honesty it is not the possession of great learning but a warm heart that will, generally speaking, make a man a good doctor. Selfish natures are never, in the sense of Erasmus, their fellow men's gods. They may be eminently fit for the laboratory and the professorship, and for helping to support the fame of national science; medical practice needs people to whom it is a pleasure, as it was to Tulp, to devote their lives to the happiness of their fellow citizens.

If I am permitted to picture the man as entirely perfect, I would also endow him with pleasant manners and a sense of art and literature. I would put him above his average patients. The country doctor should on no account become countrified; but he who attends the highest circles may also take a very special and honourable place there. He will be the friend of many a family, not through great intimacy, but because he has shared the most difficult and cruel moments in their lives, because he has got to know their faults and weaknesses and they have found a support in him, even against themselves.

In not a single other profession is there anything like the warm personal relation between doctor and patient. To be sure the notary, the lawyer, the teacher and many others are often excellent counsellors; but apart from special cases, none of them is so constantly, especially in the most difficult circumstances of life, a beacon to whole families. None but the doctor gains their confidence to such an extent, is so completely initiated in the most delicate family affairs. No one can through his personal actions alleviate so much pain both physical and mental and prevent so much disaster. Even the clergyman is in many cases not allowed to penetrate so deeply into the souls of the distressed. At the greatest, probably alas the last, international medical congress held in London in 1913, it struck me particularly to hear this opinion expressed in the two old cathedrals of the metropolis. In Westminster Abbey Bishop Ryle said that the doctor had become a more effective teacher of righteousness than the clergyman. The doctor was always the first person to be taken into one's confidence and he could speak about purity, self-control, chastity and temperance in such a way as to find listeners and perhaps followers. The dean of St. Paul's also pointed out that some functions of the medieval priests had devolved on the doctors. It was now they who listened to the confessions of anxious and repentant sinners. They had earned and received the confidence of all who were in trouble about their bodies and of many whc were in trouble about their souls. In his opinion no one could be grateful enough for the way in which this work was done, for the ability, the sympathy and the kindness which the patient could depend upon receiving from his medical adviser.

However pleasant such language sounds in our ears I am sure that many of us will think it exaggerated, applicable as it seems only to the family doctor who belongs to a species which is said to be dying out! More than once the family doctor of the present has been compared to a directory which is only consulted by the patient in order to seek the special surgeon for the organ that troubles him. Others call him a signpost with many arms indicating the direction to the various specialists. I do not agree with these gloomy statements. Also in the future I can see the family doctor performing a task much higher and more difficult than that of the specialist. Medical specialism is a child of modern technique. The specialist most in demand is he who manages, with the greatest proficiency, the marvellously refined means of investigation and treatment. The family doctor most in demand has at all times been and will ever be the man whose inner goodness radiates into the hearts of his patients. If he is however to maintain the position in which the eminent preachers at the congress saw him, then it goes without saying that a good heart alone is not sufficient. Two other factors are equally indispensable, culture and science. That this culture has nothing to do with good society manners or with classical education is self-evident. The old-fashioned doctor as I have known him, who entered the sick room quoting Latin poetry, belongs to the past. The culture I have in mind is founded on wide knowledge and serious thought; it is purified by intercourse with aged and wise people and is attended with a sense of beauty and a taste for art and letters; it is identical with kindness and recognises and spares silent grief, and is after all closely related to goodness of heart. Also as regards science the highest demands are made on the family doctor. If it is often difficult for the specialist with a busy practice to keep up his strictly professional reading the general doctor has constantly to survey the whole wide field of medicine, where on all sides the work proceeds incessantly and where, again and again, new discoveries are made. If he should imagine that Hippocratic intuition or the famous "clinical eye" is sufficient he would soon stand convicted before his patients, possibly even before the criminal judge.

It is far from me to deny the existence of diagnostic intuition, the inborn fitness for medical work. It explains the success of some quacks, who however on account of their ignorance of the human body do not, as far as the curing of diseases goes, rank higher than the Greek Asclepiads, and who, also for ethical reasons, are most dangerous persons. Nurses also sometimes have the clinical eye and I do not mind confessing that on the first suspicion of scarlatina, erysiplas and pneumonia, things which do not belong in an otological clinic, I involuntarily glance up to read the confirmation of my supposition on the face of my head nurse. The congenital bump of diagnosis which is a thing of great value to the serious doctor, becomes, like every other kind of wealth, a source of degeneration and corruption to the man of lower standing. His easy success in practice tempts him to hastiness, before long to carelessness and to self-conceit, a malady growing with advancing years, which makes him lag farther and farther behind and at last completely estranges him from constantly proceeding science. He will be more and more exposed to the danger of humiliating conflicts with the conscientiousness of younger colleagues, perhaps less talented, but who have availed themselves of every modern resource of science and technique. Surveying the whole field of medicine the clever family doctor is, to many a patient, an invaluable counsellor, who can put the directions of the specialist to other than mere technical tests, who supports good advice, who dissuades from undesirable treatment and who can often restore equanimity disturbed by contradictory diagnoses or by the tactless announcement of an unfavourable prognosis.

No assault is here intended upon the importance of medical specialism, which has rendered, and is still rendering every day, invaluable services to both practice and science. It has contrived to find access, by ways *a priori* considered impossible, to literally every organ of the human body. It has succeeded in throwing bright light into cavities of it, in which, since the time of Adam, nothing but complete darkness had prevailed. It discovers and cures diseases the existence of which had never before been surmised by any one. Also in a scientific respect it has done first-class work in a number of physiological and anatomical questions. The value of the doctor as a counsellor lies, in the first place, in his personal qualities. If a specialist is carved of the good old wood that doctors are made of and combines technical skill and a scientific mind with a warm heart, he will also be admitted to the confidence of his patients and will, now and then, have to give advice which is quite outside the sphere of his special work. This holds good, in the first place, for the nerve doctor and I would here express the hope that only men of high moral standing will devote themselves to this part of medical art. However flattering it may be to us to be taken in the confidence of a human heart in distress, we ought to accept this confidence with the greatest diffidence. The nerve doctor has often to penetrate deeply into the soul life of his patients. Modern psychoanalysis raises this cruel indelicacy to a system, a system which holds many dangers. I will only remind you of the onesided and unbalanced psychoanalysts who consider the whole soul life of a human being to be dependent upon sexual motives.

If all physicians ("in that extravagant world of which I dream") were shaped in the ideal mould I have described just now, their relation to each other would be characterized by kindness and mutual trust. After all, this also is of the greatest importance to the honour of our profession. The quarrels between medical men, to which the old prints refer, really find their explanation in the ignorance of these men each of whom fought for his own philosophy and who did not stand on a common ground where fruitful discussion would have been possible. In later years, say at the time of the founding of our Netherland Medical Association, the sad misunderstanding among the followers of the profession found its origin in their different education, knowledge and culture, and absence of any ties. The reputation and the influence of the physicians in this country was not great during that period.

In his address to the second general meeting of the Association in 1850 Gerrit Jan Mulder pointed out the connection between the facts mentioned above. "Where fellow artists appreciate each other, art is honoured," he said and history has proved him to be right. Nothing has contributed so much to the raising of our guild in the estimation of the public as the improved mutual relations between the brethren of the craft. This improvement we owe partly to the introduction of the legal uniformity of our profession, partly to the foundation of the Association which has roused the feeling of solidarity in us and has kept it up ever since. Want of goodfellowship, professional jealousy, are pernicious to the esteem in which we wish to see our art held. This is one of the reasons that our own jurisdiction, our freely accepted discipline, is among the most useful institutions of our Association. In many cases it has to remove a misunderstanding between two well-disposed colleagues to keep divergent elements in the right track; if not with their consent, then by force.

"Medical ethics" is a phrase popularly believed to express an elaborate system of arbitrary rules, by which members of the profession are more or less restrained from doing many things to which the non-medical mind sees no valid objection.[20] According to some, its chief function is to hide the errors of our colleagues from the world.

Those who are of this opinion would soon be converted to better ideas if they would make the acquaintance of Robert Saundby's "Medical Ethics" or of any other manual of medical rules of conduct. They would be pleasantly surprised to find that this etiquette is based on three principles of unsuspected venerability. Two of them are derived from the Scriptures,[21] the third and principal one has come down from classic antiquity. The first runs: "Whatsoever ye would that men should do to you, do you even so to them." This principle is to the doctor a never failing guide in everything concerning his relation to his colleagues. The second: "Render therefore, unto Caesar the things that be Caesar's," defines the place of the physician in the community and obliges him to be a good citizen. The third principle rules our relation to our patient: "The welfare of the sick is the highest law." This principle is laid down as the chief vow in the "Oath of Hippocrates,"[22] which has been taken as the foundation of medical ethics by all succeeding generations. This third principle does not, like the other two, appeal to our reason; it is directed straight to the heart. It is more than a mere incitement to do what is right. I interpret it as the expression of the serving, self-sacrificing nature of medicine, as the recognition of its divine origin.

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1. DEUTERONOMY, XXXII, 39.
2. PREUSS, J. Biblisch-talmudische Medizin. Ed. 3, Berl., 1923, p. 29.
3. ERASMUS, D. Economium arte medicae.
4. Father Cats, 1577–1660.
5. Brother to the famous Dutch physicist Christian Huygens.
6. "What an acquisition it would have been for medicine," says the paper, "if such an acute observer and accurate describer had devoted himself to it."
7. TIMBS, J. Doctors and Patients. Lond., 1876.
8. No, let the order be reversed
   Or else unlashed his crimes;
   For if he takes his physic first
   He'll never read his rhymes.
9. Hogarth's works. The Company of Undertakers (*et plurima mortis imago*), 1736.
10. Sir St. Clair Thomson, in his oration on "Shakespeare and Medicine," 1916, quoting from King Lear, "Kill thy physician, and the fee bestow upon the foul disease" remarks: "If Shakespeare did not put an occasional joke of this sort into the mouth of his characters,

neither he nor they would be true to life."

11. Van Rynberk, N. The Future of the Medical Profession in The Netherlands.
12. Shaw, G. B. The Doctor's Dilemma. Preface on Doctors.
13. N. Tulp (1593–1674) was burgomaster of Amsterdam and at the same time lecturer of anatomy. It is he who, in Rembrandt's famous "Anatomical Lesson," makes the demonstration.
14. This motto is to be found under the beautiful portrait of an unknown engraver in the Collection of Prints in the Ryksmuseum, Amsterdam, where Tulp sits at a table in his function of burgomaster, with a candle in front of him. For the rest the well-fed appearance of Tulp is somewhat in contradiction with the inscription!
15. Wells, H. G. An Englishman Looks at the World: Doctors.
16. "The sane, practical man shakes his head, smiles pityingly at my dreamy impracticability and passes them by."
17. And Boerhaave's favourite maxim was *Simplex veri sigillum!*
18. Wilhelm Busch says philosophically:
    Es wird auf dieser Erde immer
    Das Leben mid dem Tod bestraft.
19. Naunyn. Die Entwicklung der inneren Medicin im 19. Jahrh. Jena, 1900.
20. Carter, Brudenell. Doctors and Their Work. Lond., 1903, p. 236.
21. St. Matthew vii, 12; St. Luke xx, 25.
22. See e.g. W. H. S. Jones. The Doctor's Oath. Cambridge, 1924.

SQUIER LITTELL, M.D.*

A FOUNDER OF AMERICAN OPHTHALMOLOGY

By BURTON CHANCE, M.D.

PHILADELPHIA

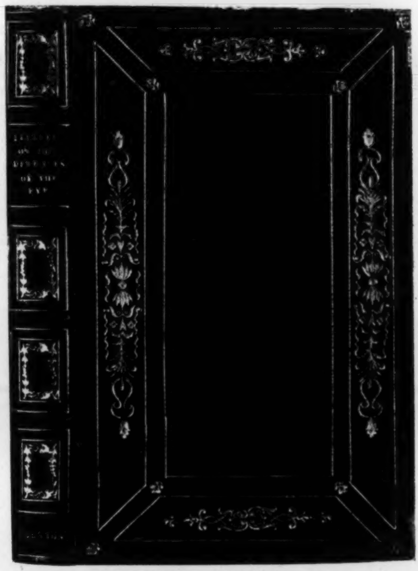

FIG. 1. LITTELL'S MANUAL.

THIS dainty volume is not a "Collection of Sonnets," nor yet a beautifully bound "Book of Private Devotions;" but, as the "Author's Advertisement" states, it is a "summary of modern practice which should comprise all the recent improvements, and exhibits in a compendious form, the actual extent of our information on the importance of the organ of vision, and the facilities afforded by its structure for the investigation of the various morbid affections to which it is exposed;" in short, "A Manual of the Diseases of the Eye; or, Treatise on Ophthalmology, by S. Littell, M.D. One of the surgeons of the Wills Hospital for the Blind and Lame, Fellow of the College of Physicians of Philadelphia, revised and enlarged by Hugh Houston, Member of the Royal College of Surgeons, London: John Churchill, Princes Street, Soho. MDCCCXXXVIII." The volume is a small 16 mo., of beautifully clear letter press, and gilt edges, bound in full brown maroon morocco, exquisitely tooled on the sides, back and the inner edges. As the word "Houston" is in the lowest panel, it is likely that this book was the personal copy of the editor.

The work of itself, should be precious to us of this Section, because the original work was published in 1836, in Philadelphia, by one who assisted in the foundation of ophthalmic science and practice in this country; him who dared to offer, in the face of the prestige attained in America by the voluminous works of Lawrence, Travers, Mackenzie, Middlemore and others, which works were accepted as the standard authorities for all practitioners, a "compend of all that was valuable and necessary for the ophthalmic student." Also, in spite of the authority of these great works in England, that there should have been felt even there the need for the publication of a manual of 250 pages! Moreover, it is a marvellous tribute to the infant school of Ophthalmology in America, that the original was edited, and the edition printed and published in England and favorably noticed in the English reviews and journals of its day. And, lastly, the College has not possessed this edition of a work by one of its highly honorable Fellows.

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* Read at the presentation of an English edition of his "Manual," published in 1838, to the Section on Ophthalmology of the College of Physicians, Philadelphia, February 16, 1928.

The name of Squier Littell is now all but forgotten in medical circles, although for over fifty years it was well known in America. He died in Philadelphia, in July 1886, after a long period of retirement, aged eighty-three years. He was one of the four surgeons to serve on the first appointed staff of the Wills Hospital when that Hospital was opened in 1834; and he served there continuously till 1863, a period longer than anyone yet had served up to the time of his death.

Dr. Hall has left an intimate and worthy memoir of Littell, which was printed in the Transactions of the College shortly after his death. From that I have taken most of the facts concerning the life and works of one whose memory I desire to honor by inspiring in you thoughts of him tonight.

I have my own recollections of him. His grandson was my schoolmate, and I saw the dignified, aged gentleman repeatedly when I visited their house on Spruce Street. Dr. Douglass Hall, his son-in-law, was my first oculist, and, later, during my medical school days, a faithful friend. I can recall my first meeting with Dr. Littell. He came quietly into the breakfast room, giving evidence of poor sight. When I was presented to him, he spoke kindly to me, but in a moment asked what I intended to do when I became a man, I was at that time twelve years old, I told him I expected to study Medicine, and, that I wished to be an "Eye Doctor." He peered at me through his small octagonal spectacles, and said rather sternly "Young man, you don't know what you ask." It is true, I didn't know; however, I remembered his words when I passed under his portrait hanging in the halls of the Wills Hospital, on the day when I began my service as surgeon, as one of his successors, at the hospital.

Dr. Littell was descended from families which had come from England to the Colonies before 1700, of which, many members on both sides had served the State and their communities with honor and distinction. He was born in Burlington, N. J. in 1803. His parents dying in his childhood, he was adopted by an uncle, Dr. Squier Littell, of Ohio, to whom he was taken at twelve years of age by a recent graduate of the Medical School of the University of Pennsylvania. The difficult journey thence required two weeks. His early education was such as the frontier afforded, and he entered on his medical studies with his uncle, dividing his time between the labors of the farm and the house. In 1821 he returned to Philadelphia and became the office student of Dr. Joseph Parrish. In 1824, he graduated from the University; his thesis, "On Inflammations," being an exposition of the views of the great French teacher Bichât, excited favorable comment. He aspired to teach anatomy, in which study he made flattering progress. He began a wide course of reading and soon supplied some of the defects of his earlier education.

He was of a retiring disposition and had at times a stammering impediment in his speech which prevented him from asserting himself. The struggle for immediate success in practice seemed too great, so he was induced to go to South America where a position had been offered. This failed, but before he returned to North America, he passed the "Licentiate" examination in medicine before the Academy of Buenos Ayres: and later sailed "round the Horn" to Guayaquil, and on to Panama and Carthagena. On his return his aspirations to teach were abandoned and he reluctantly devoted himself to the duties of a private practitioner. Modestly concealing his name and address he early published an article on "The Use of Cold Water as a Remedial Agent," in the *North American Medical and Surgical Journal*, for 1828, of which most favorable comments were made, and it was translated in the French journals!

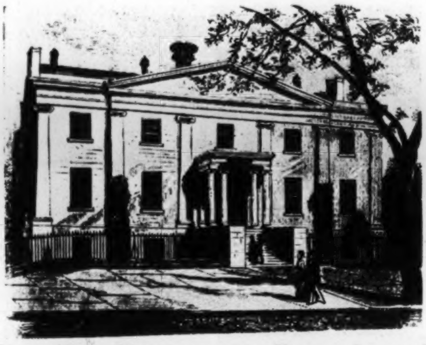


Fig. 2. Wills Hospital, in the Time of Littell's Service. From an Old Lithograph.

When the Wills Hospital was organized in 1834 he was chosen one of the four Surgeons selected, with Hays, Fox, and Parrish, his preceptor, and he continued to serve the hospital without a break for thirty years. He and Douglass Hall, who also became a surgeon, together served the hospital over a period of sixty years!

Dr. Littell was very painstaking and conscientious in his attendance upon the Hospital and would often go several times a day or make a night visit to patients whom he thought required his attention. He became a patient and cautious investigator, not over-anxious to operate, but bold in execution when surgical interference was required.

One of the earliest fruits of his connection with the Wills was his publication, from the press of John S. Littell, Philadelphia, in 1837, of a "Manual of Diseases of the Eye," thus producing one of the earliest works in this country on that subject; indeed, it was only the third comprehensive work on the diseases of the eye that had been published in America, having been preceded by Frick's in 1824, and Gibson's, in 1832. He had from time to time contributed articles on subjects derived from his special cases, the chief of which is accounted for by the following. It was the rule of the Hospital that the Surgeons should render at the termination of their quarterly terms of service, a detailed account of the service to the Board of Managers. The individuals served for periods of three months each, and not all the year around, as at present. Littell enlarged on his first report, by contributing in 1835, a paper, which is historically important in Ophthalmology in this country, entitled, "A Quarterly Report of Diseases Treated at Wills Hospital for the Blind and Lame, with some account of the Hospital," in the *American Journal of the Medical Sciences*, for that year. This described the original Hospital, which was architecturally a masterpiece, and which must have been commodious and convenient for the care of the patients; and he portrays in extensive detail several diseases then under treatment there.

Littell's was a general practice in every sense of the word, for he attended to the diseases or injuries of the eyes in the course of the routine of his practice. His early appointment to the Hospital gave a bias to his practice, however, and more or less directed that class of practice to him, still, he disclaimed any title to specialist, and continued so to do all his life. Indeed, at that time special practice was unknown. The general profession was not only not ready for it, but was decidedly averse to it. [Some of you will recall that I spoke to you last year of Dr. William Norris' difficulty, nearly thirty years later, to persuade his family and friends that he was not intending to set himself up as a quack when he aspired to and began the practice of Ophthalmology in Philadelphia.]

Littell was conservative by nature, slow to adopt new methods. His greatest activities were in the pre-ophthalmoscopic days. When no longer young he devoted himself to mastering the difficulties of the newly discovered ophthalmoscope, and Dr. Hall records that he used it habitually and intelligently in his practice. It is not readily conceived by practitioners of today how portentous was the discovery of the ophthalmoscope, indeed, the first users themselves scarcely realized how far-reaching were the results of their observations. The practical application of the instrument to diagnosis and treatment; the resulting recognition of nervous disease, increased the labors and responsibilities of the ophthalmic surgeon and hastened the day when this department of medicine naturally and easily took its place as a legitimate specialty.

Likewise is it difficult for us to realize that this "compendium of the complete science of ophthalmology" contained nothing concerning the diseases of the ocular fundus; confused the symptoms of glaucoma with cataract and other now well-defined affections, and possessed no directions for the cure of the malady; expressed nothing concerning the microscopic characters of pathological states; and, incredible as it may seem, the author felt bound to state that "there are reasons which will ever prevent extraction of cataract from being practiced by the great body of the profession"! The author's knowledge was gained from observation by the unaided eye, from the painstaking recording and analysis of the reactions of the tissues to the infections invading them, and through the training of his hand. I vividly recall his long slender sensitive hands with their tapering fingers.

In 1846, a second edition of his "Manual" was published in Philadelphia, by Hogan and Thompson, with the subtitle, "Or, Treatise on Ophthalmology." The "Manual" was not merely a compilation but represented especially in this last edition, the results of the large experience of himself and his colleagues at the Wills Hospital. The copy of the first edition which I possess was from the library of Dr. William Horner. It would be interesting to speculate on what subjects Horner and Littell might cogitate in their walks about the city on their way to hospital and medical school.

The two editions received the highest commendation in Great Britian as well as in America. *The British* *and Foreign Medical Review*, for 1838, in "recommending it to the Profession," found the first edition "replete with information, yet so terse in style and compressed in bulk, as to at once entice and repay perusal," and agreed "in most points with the author's pathological inductions and practical precepts." It naively declared "the language is free from any tinge of Americanism!"

> The descriptions are short but comprehensive, while the treatment is characterized by great prudence: on the one hand avoiding the charge of inactivity and feebleness, on the other never risking the more serious results of chronic mischief and broken health from excessive depletion, or the depressing effects of violent mercurial courses; of which faults some of our own [British] countrymen are not wholly innocent.

In the English edition the editor added but little to the subject-matter. In the original, there is at the end a list of formulae, but in this, these, and a number of others in use at well-known hospitals in England were inserted in appropriate places through the text. An enlarged vocabulary, a copious alphabetical index, together with the table of contents served as references for the practical use of the book.

Among his other writings on special subjects may be mentioned "Tumour of the Base of the Cranium producing Amaurosis, Exophthalmos and Death," in the *American Medical Intelligence*, 1838; An American edition of "Walton's Ophthalmic Surgery," with notes, in 1853; "Notes on Secondary Variolous Ophthalmia," in the *Medical Examiner*, 1855; a "Memoir on Granular Ophthalmia," in the *Transactions of the Congress d'Ophthalmologie de Bruxelles*, Bruxelles 1857.

In opposition to the great mass of the profession he, singularly, doubted the efficacy of vaccination, notwithstanding which, he, in deference to the prevailing opinion, did not fail to perform it; nor would he believe in the malarial origin of disease, because from his observations and reading he had been led to results differing from those most commonly recorded.

He maintained strong prejudices concerning the entrance of women into the practice of medicine, and in 1868 published a "Letter in Reference to Female Physicians," in the *Western Journal of Medicine*. This "letter" stands as an interesting document in the history of the higher education of women, which should be read by all proponents of the subject to learn of the points of objection advanced by their opponents, sixty years ago.

In 1836 he was elected a Fellow of this college, and for a number of years he served on the Council. From time to time he presented memoirs of deceased Fellows, of special mention being the obituary of Dr. George B. Wood, his devoted and admired friend to whom he dedicated his "Manual."

His intellectual activity was not confined to Medicine only; he roamed over the whole field of literature. He was a great reader and gifted with such a memory that he could repeat whole pages of poetry and quote with the greatest ease long passages of prose. Even as an old man he seemed never to forget anything. In addition to his wide reading he possessed the literary gift and he wrote much on a great variety of subjects. He was fond of poetry and possessed an easy faculty for versification. He indited sonnets, and composed hymns expressive of the highest devotion.

In his early years he entered the Episcopal Church and during the whole of his subsequent life took the warmest interest in her progress and welfare. Devoted to the church of his choice he with pen and personal influence from his early youth, used his talents in her service. He edited several church papers, and, in 1838, was appointed to revise the prayer book. Naturally of a strong religious nature, even when the infirmities of age might have been pleaded for self-indulgence, he was to be seen twice a day in his pew in St. Mark's Church, on Locust Street where I remember seeing him from my place in the choir of which I was a member.

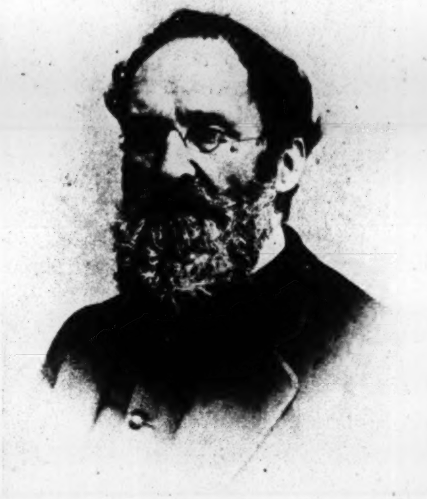


FIG. 3. SQUIER LITTELL, M.D. FROM A PHOTOGRAPH ABOUT 1870.

After being in practice a number of years, he married Mary Emlen, who died in a few years leaving a daughter and an infant son. He never recovered from the effects of this crushing blow, and he lost his hitherto keen interest in his profession. His strong natural melancholy caused him to take diminished interest in all surrounding things except the care and welfare of his children, for whose sakes he voluntarily resigned himself to a lonely life.

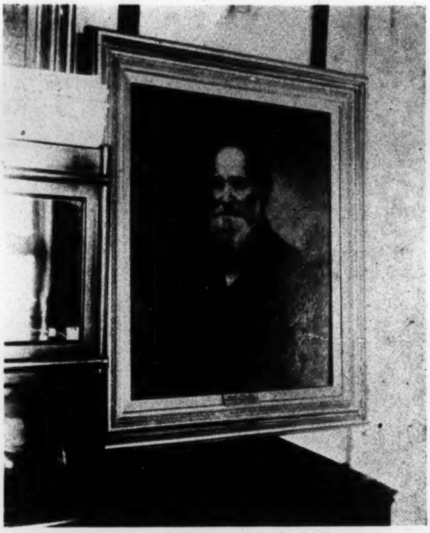


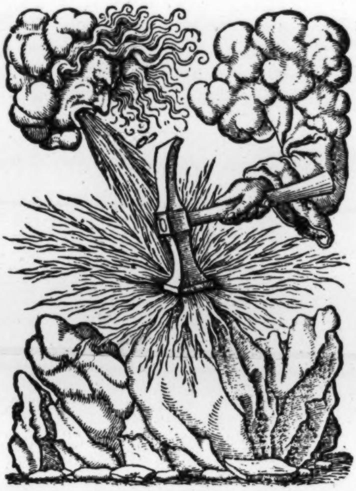
FIG. 4. PORTRAIT OF SQUIER LITTELL AGED ALMOST EIGHTY, BY BROWN. NOW IN THE LIBRARY, WILLS HOSPITAL, PHILADELPHIA.

His constitution had always been good, and his regular and temperate life had kept him comparatively young well on into advanced life. But as he approached his eightieth year his sight began to fail from an affection of the choroid. This to a man so fond of books was one of the severest trials of his old age, yet it was borne with the greatest patience and submission. No word of complaint was heard to fall from his lips. When the dreaded time came it was found that he had most patiently adapted himself to his privation and his thoughts were engaged more for others than centered upon himself. As age crept on. feebleness of his limbs prevented much walking exercise of which he had been very fond.

Early in 1886 his powers began to fail more and more. In June of that year, to escape the trials of the summer in the City, he removed to Bay Head, New Jersey, but soon after his arrival marked changes in his health followed, and on Sunday, July 4, he was found dead in his bed.

"Thus," in the language of Dr. Hall, "ended the earthly life of one who had walked humbly with his God, and in great singleness of purpose had endeavored to do his duty to those about him."

In memory of this courteous gentleman, whose life and works were an honor to the profession and whose efforts tended to the creation of the American School of Ophthalmology I present this treasured book to the Section with the hope that it may be found worthy to repose among the valuable collection of early Americana now in possession of the College.



BIBLIOGRAPHICAL MATTERS PERTAINING TO THE DISCOVERY OF THE CIRCULATION OF THE BLOOD

BASED ON THE TERCENTENARY EXHIBIT OF HARVEIANA BY THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

By E. B. KRUMBHAAR, M.D., PH.D.

PHILADELPHIA

IN connection with the celebration by the College of Physicians of Philadelphia of the tercentenary of William Harvey's discovery of the circulation of the blood, a noteworthy exhibit of Harveiana and items bearing on the history of the circulation of the blood was arranged. To make a permanent record of this exhibit and also to bring together in convenient form an annotated list of pertinent items, with translations of appropriate passages in the most important works, is the object of the following article. Lengthy quotations have not been shunned, as the antiquated points of view and atmosphere of their authors can thus best be reproduced.

Thanks largely to the interest that the late Weir Mitchell took in Harvey and Harvey's discovery, perhaps the greatest in the history of medicine, the College of Physicians has an unusually rich Harvey collection, which with various rare medical books of associated interest permitted a display of several hundred items, all from the shelves of the College library.

The occasion being the tercentenary of the discovery of the circulation, the idea has been followed of presenting not only Harvey's individual contributions, associations and relics, but also the works and portraits of Harvey's predecessors in this field, of his contemporaries, both supporters and opponents, and of the more important modern commentators on the subject. In the exhibit on March 22 to 23, 1928, relevant passages in the various books were indicated, as far as possible, by cards with translations and explanations.

Thus the rare *editio princeps* of Hippocrates was opened at the page (*περίκαρϑιής*), describing the heart's contractile action and its four chambers; Aristotle's "De Respiratione" at Chapter 20, showing Aristotle's incorrect explanation of the cause of the heart beat; an early Galen "Opera Omnia" at the place where he contradicts Erasistratus' view that the arteries contain air:

> That the arteries contain blood and, when wounded, discharge nothing but blood, no one will deny who has seen one of them divided. They, therefore, who, with Erasistratus, maintain that the arteries contain air, are forced to admit that they must have communications or synanastomoses with the veins ["De Usu Partium," lib. VI, Chap. 21; see also "Liber an Sanguis in Arteriis Natura contineatur?"].

An opened Vesalius pointed out the impermeability of the ventricular septum; an early work of Eustachius, with portrait, was included to call to mind his largely forgotten discovery of the thoracic duct and the lymphatic contribution to the circulation.

Harvey's teacher at Padua, Fabricius, appears both for this reason and for his description of the valves in the veins, even though he misunderstood their function, and, ever a Galenist, thought that the blood flowed centrifugally in the veins:

> Little doors of the veins is the name I gave to certain very thin little membranes occurring on the inside of the veins, and distributed at intervals over the limbs, placed sometimes one by itself, and sometimes two together. They have their mouths directed toward the root of the veins (i.e. the heart), and in the other direction are closed. Viewed from the outside they present an appearance not unlike the swellings which are seen in the branches of the stem of a plant. In my opinion, they are formed by nature in order that they may to a certain extent delay the blood and so prevent the whole of it flowing at once like a flood, either to the feet, or to the hands and fingers, and becoming collected there. For this would give rise to two evils; on the one hand the upper parts of the limbs would suffer from want of nourishment, and on the other the hands and feet would be troubled with a continual swelling. In order, therefore, that the blood should be everywhere distributed in a certain just measure and admirable proportion for maintaining the nourishment of the several parts, these valves of the veins were formed.
>
> In the veins laid bare and examined untouched, these valves are visible to a certain extent. Nay more, that even in the living arm or thigh these valves may give evidence of their existence appears clearly from the fact that, when in letting blood the assistants bind the limbs, little knots as it were are seen from the outside at intervals along the course of the veins; these are swellings caused by the valves.
>
> That indeed the flow of the blood is slowed by means of these valves is not only made clear by their construction but is also shewn by the following experiment which anyone can make, either by laying bare the veins in a dead body, or by ligaturing a limb in a living body, as they do when they let blood. For if you attempt to press, or by rubbing to drive the blood downwards (towards the hand for instance), you will clearly see that its flow is prevented and delayed by the valves. [Cf. Harvey's experiment] ["De Venarum Ostiolis," Patav., 1603].

Canano's relationship to the discovery of the valves of the veins is discussed in Cushing and Streeter's recent facsimile edition.

An Elzevir Rabelais and portrait were introduced only to dispose of the French claims in a typed annotation from Hemmeter, ("Master Minds in Medicine," p. 226):

> The French have claimed the discovery of the circulation of the blood, and their discoverer is that incomparable satyric, François Rabelais, and this assertion is made by no less than Paquelin. But a critical study of the passages of Rabelais, which Paquelin cites, proves that the alleged French discoverer brings nothing new, nothing which was not already stated by Galen, that he nowhere mentions dissections or vivisections as a basis for his claims.

Of Harvey's immediate predecessors, Servetus was represented by an original copy of "De Trinitatis Erroribus," also by a direct transcript from the eighteenth century Nuremberg reprint of the "Restitutio Christianismi (1553)," showing his knowledge of the pulmonary circulation. There are, of course, only three existing copies of this rarest of medical monuments at Edinburgh, Paris and Vienna. The rare contemporary "Historia Michelis Serveti" with portrait was exhibited in both the Latin and Dutch editions.

The passages in Servetus' "Restitutio Christianismi" which relate to the pulmonary circulation, are as follows:

To this purpose, the first thing to be understood is the substantial generation of the vital spirit itself; which is composed of, and nourished by, the inspired air, and the most subtle blood. The vital spirit has its origin in the left ventricle of the heart, the lungs greatly assisting in its generation. It is a subtle spirit elaborated by the force of heat, of a bright (*flavo*) colour, with an igneous power, a lucid vapour as it were, from the purest blood, containing in itself the substance of water, air, and fire. It is generated by a mixture made in the lungs of the inspired air, with the double elaborated blood which the right ventricle of the heart communicates to the left; but this communication is not made through the middle partition (septum) of the heart, as is commonly believed; the subtle blood is agitated or moved in a highly artificial manner, from the right ventricle of the heart, in a long duct through the lungs; it is prepared and made bright by the lungs, and transfused by the arterial vein (pulmonary artery) to the venal artery (pulmonary veins); then it is mixed with the inspired air in the venal artery, and cleansed from grossness by expiration: and thus the whole mixture is finally drawn from the left ventricle of the heart through the diastole, a suitable apparatus, that it may be made the vital spirit.

FIG. 1. PHOTOGRAPH OF EXHIBIT OF HARVEIANA AT COLLEGE OF PHYSICIANS, MARCH, 22, 23, 1928, IN CONNECTION WITH THE HARVEY TERCENTENARYCELEBRATION.

The varied conjunction and communication of the venal artery with the arterial vein in the lungs, show that the communication and preparation are thus made by the lungs: the great capacity of the venal artery confirms this: it would neither have been made in such form and magnitude, nor could it emit such a power of the purest blood from the heart into the lungs, solely for their nourishment, nor could the heart be subservient to the lungs for this purpose, particularly as the lungs themselves, while in embryo, were accustomed to receive their nourishment from elsewhere, for those small membranes or valves of the heart are never opened, as Galen shows, till the time of birth; therefore, the blood is poured, and so copiously, from the heart into the lungs, at the very time of the birth, for some other use. It is also not simply air, but air mixed with blood, that is sent from the lungs to the heart through the arterial vein; therefore the mixture is made in the lungs. The bright color is given to the sanguine spirit by the lungs, not by the heart: in the left ventricle of the heart the space is not capacious enough for so copious a mixture, nor is the elaboration there sufficient to produce the bright colour. Moreover, as the middle partition is deficient of vessels and faculties, it is not adapted to that communication and elaboration, although something may possibly exude through it.

The vital spirit, therefore, is afterwards transfused from the left ventricle of the heart into the arteries of the whole body, so that the finer part may seek the superior place where it is yet further elaborated, especially the retiform plexus, situated at the base of the brain, in which, from the vital, it begins to be the animal spirit, approaching to the proper seat of the rational soul: it is again refined, elaborated, and perfected, by the igneous force of the more powerful mind, in the very slender vessels or capillary arteries which are situated in the choroid plexuses, and contain the very mind itself.[1]

A first edition of Realdus Columbus' "De Re Anatomica," published posthumously at Venice in 1559, afforded to those with sufficient Latin a view of his own words, illustrating his contributions to the knowledge of the pulmonary circulation. A translation of the significant passages follows:

> Two cavities, that is two ventricles, are present in the heart, not three as Aristotle thought. Of these, one is on the right side, the other on the left. The right is much larger than the left. The right contains the natural blood, but the left the vital blood. It is very interesting to observe that the substance of the heart surrounding the right ventricle is very thin but on the left side is very thick; and this is so arranged on the one hand in order to keep up the balance and on the other to prevent the vital blood which is exceedingly thin from transuding out of the heart. Between these ventricles there is placed the septum through which almost all authors think there is a way open from the right to the left ventricle; and according to them the blood is in the transit rendered thin by the generation of the vital spirits in order that the passage may take place more easily. But these make a great mistake; for the blood is carried by the artery-like (pulmonary artery) vein to the lung and being there made thin is brought back thence together with air by the vein-like artery to the left ventricle of the heart. This fact no one has hitherto observed or recorded in writing; yet it may be most readily observed by anyone. [Page 177, line 10.]

And again, speaking of the vein-like artery (pulmonary vein) he says:

> Anatomists, not very wise, begging their pardon, in so doing think that the use of this is to carry the changed air to the lungs which, like a fan, ventilate the heart, cooling this organ and not as Aristotle thought, the brain. The same writers think that the lungs receive the I know not what smoky fumes, (fumos capinosos) (for so in their ignorance of the tongues they call them) discharged from the left ventricle. About this, all one can say is that it pleases them, for they certainly seem to think that the same state of things exists in the heart

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[1] From Pettigrew T. J. Medical Portrait Gallery. Biographical memoirs of the most celebrated physicians, surgeons, etc., who have contributed to the advancement of medical science. Lond., Fisher & Sons, 1840, p. 6. A perhaps more literal translation can be found in Willis, R. The Works of William Harvey, M.D. Lond., Sydenham Soc., 1847, p. 77.

as in a chimney, as if there were green logs in the heart which give out smoke when burnt. So far concerning the use of these parts according to the opinion of other anatomists. I for my part hold a quite different view, namely that this vein-like artery was made to carry blood mixed with air from the lungs to the left ventricle of the heart. And this is not only most probable, but is actually the case; for if you examine not only dead bodies but also living animals, you will find this artery in all instances filled with blood, which by no manner of means would be the case if it were constructed to carry air forsooth and vapours. Wherefore I cannot wonder enough at those anatomists who have not observed a matter so clear and of such importance, eminent though they wish to be considered and indeed are considered by many of their fellows. But for these it is enough that Galen said so. What? To think that some folk in our time swear to the dogmas of Galen about anatomy, so that they dare to assert that Galen ought to be taken as gospel, and that there is nothing in his writings which is not true! It is wonderful how men are carried away by this doctrine; and the princes of anatomy offer it to the rabble. Yet no one sees how much this is to be blamed. Who indeed is there who never offends? But of this enough and more than enough.

Cesalpinus, known chiefly as a botanist to his contemporaries, was represented by a first edition of "De Plantis" ("The blood is led by the veins to the heart and by the arteries is distributed to the whole body . . . "), and also by his "Speculum Artis Medicae Hippocratium" (Francoforti, 1605). The following passage from his "Quaestionum Peripateticarum Libri quinque"[2] (Florentiae, 1571) presents his views about the contraction of the heart and the pulmonary circulation:

For the membranes are so placed at the orifices that they are opened when the heart is dilated and are closed when the heart is contracted. It follows therefore either that the lung and heart must be dilated at the same time and constricted at the same time; or the entrance of the spirits must take place when we breathe out. For if the heart happens to be dilated while the lung is constricted, and to be constricted while it is dilated, the air will enter the heart when we breathe out and issue from the heart when we breathe in; which is impossible for the movements are in a contrary direction. To say, however, that the heart and lung are always dilated at the same time and contracted at the same time is opposed to facts, for we can regulate our breathing by our will, but the beat of the heart is wholly beyond our power; and even when we are breathing involuntarily, breathing is in most cases slower than the pulse.

The pulse of the arteries presents another difficulty. Of the vessels ending in the heart, some send into it the material which they carry, for instance the vena cava into the right ventricle, and the vein-like artery (pulmonary vein) into the left; some on the other hand carry material away from the heart, as for instance the aorta artery in the left ventricle and the artery-like (pulmonary artery) vein nourishing the lung in the right. To each orifice are attached little membranes whose function is to secure that the orifices letting in do not lead out and that those leading out do not let in. It follows that when the heart contracts the arteries are dilated, and when it is dilated they are constricted; the two are not, it appears, constricted and dilated together. For when the heart is dilated, it wishes that the orifices of the vessels which lead out should be shut so that material should not flow from the heart into the arteries, but that it should flow in this way when the heart contracts, the membranes gaping (and affording a passage). If therefore the arteries were dilated and constricted at the same time as the heart, it would follow that they would be dilated at the time when the material filling them from the heart was denied them, and constricted at a time when material was flowing into them from it. But it is manifest that this is impossible. To say therefore that the heart and arteries beat at different times is to deny one's senses and to doubt reason.

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[2] Cesalpinus is said by Richet and others to have used the term, *circulazione* in this work for the first time. I have not as yet been bale to find it.

From the second edition of Cesalpinus' "De Quaestiones Medicae" (1593) we may read:

> But the following matter seems worthy of consideration, the reason, namely, why veins when ligatured swell on the far side and not on the near side of the ligature. This is a fact well known by experience to those who let blood; for they place the ligature on the near side of the place of incision, not on the far side, because the veins swell on the far side, not on the near side of the ligature. But exactly the contrary ought to happen if the movement of the blood and the spirits took place in the direction from the viscera to all parts of the body. When a channel is interrupted, the flow beyond the interruption ceases; the swelling of the veins therefore ought to be on the near side of the ligature.
>
> Here is the solution of the doubt arising from what Aristotle writes concerning sleep when he says: "It is necessary that what is evaporated should be driven to some place and then be turned back and changed like Euripus [a tidal river with ebb and flow]. For the heat of every living thing ascends by nature to a higher place, but when it has reached the higher place, it in many cases turns back again and is carried downwards." This is what Aristotle says. Now to explain this passage we must recognize the following. The passages of the heart are so arranged by nature that from the vena cava a flow takes place into the right ventricle, whence the way is open into the lung. From the lung moreover there is another entrance into the left ventricle of the heart, from which then a way is open into the aorta artery, certain membranes being so placed at the mouths of the vessels that they prevent return. Thus there is a sort of perpetual movement from the vena cava through the heart and lungs into the aorta artery as I have explained in my Peripatetic Questions.
>
> Now when we are awake the movement of the native heat takes place in a direction outwards, namely, to the sensory regions of the brain. When we are asleep however it takes place in the contrary direction toward the heart. We must therefore conclude that when we are awake a large supply of blood and of spirits is conveyed to the arteries and thence to the nerves. When we are asleep however the same heat is carried back to the heart not by the arteries but by the veins. For the natural entrance into the heart is furnished by the vena cava, not by the arteries. A proof of this may be seen in the pulses, which when we are wide awake are full, vehement, quick, with a certain rapidly repeated vibration, but when we are asleep are small, languid, slow and infrequent. For in sleep the supply of native heat to the arteries is diminished, but it bursts into them with vehemence when we wake. The veins however behave in an opposite manner; but when we are asleep they are more swollen, when we are awake they are shrunken, as anyone may see who watches the veins in the hands. For when we are asleep the native heat passes from the arteries by that communication of orifices which we call anastomosis into the veins and so to the heart. As however this flowing out of blood to the higher regions, and its return to lower regions like a Euripus is manifest in sleep and wakefulness, so also a movement of the same kind is obvious in every part of the body to which a ligature is applied, or where the veins are blocked in any other way.

For when its free channel is obstructed, a stream swells at the point toward which it is accustomed to flow. The blood then rushes forcibly back to its source, lest, being cut off, it should be extinguished.

Another Italian connected with a knowledge of the circulation is Carlo Ruini, Bolognese senator and author of the famous "Anatomy and Diseases of the Horse," published the year of his death and thirty years before Harvey's work. (Del' Anatomia e della Malattie del Cavallo, Bologna, 1598, Fol.) Though this book was not available in the original, the commentary by Professor Ercolani was exhibited, with the following significant passages from Ruini's Anatomy in the chapter on the heart (Ch. 12, Bk. 2):

> The function of these ventricles is for the right ventricle to dispose of the blood from which are generated the vital spirits and the lungs are nourished; the function of the left ventricle is to receive the blood that is already made over (*disposto*), to convert one part into the spirits which give life and to send the rest together with these spirits through the arteries to all the parts of the body. In each of the ventricles are two mouths or apertures; through those of the right ventricle the blood from the great vein, the cava, enters and goes out through the arterial vein [pulmonary artery];[3] and through those of the left ventricle, the blood enters through the venous artery [pulmonary veins] accompanied by the air prepared in the lungs; this blood made entirely spirituous and very perfect in the left ventricle issues [guided by the great artery] through all the parts of the body, except through the lungs, to let them participate in that heat that gives them life.

Then follows an accurate and detailed description of the four sets of valves, with a correct description of their periods of opening and closing and the function served thereby. For instance, of the auriculoventricular valves, Ruini says:

> These fabrics [*tele*, i.e. valves] were placed there by nature so that, opening when the heart dilates [*s'allarga*], they allow the blood to enter from the great vein into the right ventricle, and when the heart withdraws [*si ritira*, i.e. contracts], by closing the first orifice, they prevent the blood that has entered from the great veins from returning from the arterial vein and reëntering the great vein. The fabric which stands at the second mouth of the same right ventricle, to which is attached the arterial vein, is not made of a simple veil but is divided into three very distinct ones, each of which commences, as in a semicircle, from the trunk of the arterial vein . . . These three veils, by opening, let the blood enter through the arterial vein to the lungs; and when the heart dilates, prevent the mouth of the arterial vein from opening and letting the blood return to the right ventricle. Almost in the same way as in the first aperture of the right ventricle, there is placed another veil [mitral] at the beginning of the first orifice of the left ventricle, from which arises the venous artery, which is distributed through the lungs, except that it is not divided into three parts, like the other, but only into two . . . Its function is that by opening when the heart dilates, it lets the blood and the spirits of the venous artery into the left ventricle; when the heart withdraws, the blood and the spirits do not return again into the venous artery . . . The three valves of the second orifice of the left ventricle to which is attached the great artery [aorta] . . . by opening when the heart is

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[3] The bracketed terms in English have been added for greater clarity by the author, who also apologizes for the various imperfections of his translation of the Italian text as given by Ercolani.

retracted, allow the vital spirit to escape with the blood, which goes out when the large artery is filled up; and when the heart is enlarged, by closing the aperture, they prevent the spirit and the blood from reëntering the ventricle.

From such a description, which fits perfectly with modern views, if one understands that by "vital spirit and blood" arterial blood is meant, one can only infer that Ruini had a progressive movement in mind, and not the Galenic ebb and flow. The word circulation, to be sure, is not mentioned, neither is the idea elaborated or supported by experiment, glories unquestionably to be reserved for Harvey, but if Ercolani's transcript is correct, (as it seems to be on comparison with the original in the Surgeon General's Library), a fairly adequate concept of the circulation must be allowed to Ruini as to Cesalpinus, though one may also agree with Willis, who sees no ground for speaking of Ruini as the discoverer of the circulation. In all evaluations of the work of Harvey's predecessors, too, it is well to recall that cyclic and circular happenings and concepts (Nietzsche's eternal return) were commonplaces of the pre-Platonic philosophers and continue to reappear through the centuries.

Of Harvey's own works there were first of all twenty-two of the twenty-eight existing editions of "De Motu Cordis," including all the earlier rarer copies. This is, next to that of the British Museum, the largest collection in existence. The following passages summarize Harvey's views, which are discussed in detail in Doctor MacLeod's address. In the ninth chapter of "De Motu Cordis," Harvey advances his proofs of the circulation, in the following concise manner:

> First, that the blood is continually, and without intermission, transmitted out of the vena cava into the arteries, in so great abundance, that it cannot be recruited by those things we take in, and insomuch that the whole mass of blood would quickly pass through. In the second place, that continually, duly, and without cessation, the blood is driven into every member and part, and enters by the pulse of the arteries, and that in far greater abundance than is necessary for nourishment, or than the whole mass is able to furnish. Thirdly, that the veins themselves do perpetually bring back this blood into the mansion of the heart.
>
> Those things being proved, I think it will appear that it doth go round, is returned, thrust forward, and comes back from the heart into the extremities, and thence into the heart again, and so makes as it were a circular motion.*

Chapter fourteen reads as follows:

> And now I may be allowed to give in brief my view of the circulation of the blood, and to propose it for general adoption.
>
> Since all things, both argument and ocular demonstration, show that the blood passes through the lungs and heart by the action of the [auricles and] ventricles, and is sent for distribution to all parts of the body, where it makes its way into the veins and pores of the flesh, and then flows by the veins from the circumference on every side to the centre, from the lesser to the greater veins, and is by them finally discharged into the vena cava and right auricle of the heart, and this in such a quantity or in such a flux and reflux thither by the arteries, hither by the veins, as cannot possibly be supplied by the ingesta, and is much greater than can be required for mere purposes of nutrition; it is absolutely necessary to conclude that the blood in the animal body is impelled in a circle,

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* (From Pettigrew, *op. cit.*, pp. 9, 10.)

and is in a state of ceaseless motion; that this is the act or function which the heart performs by means of its pulse; and that it is the sole and only end of the motion and contraction of the heart.[4]

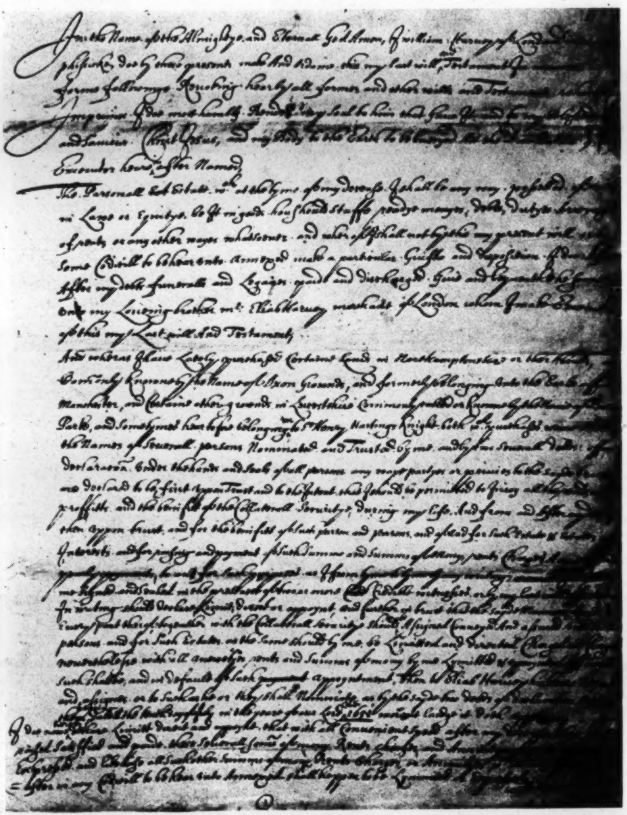

FIG. 2. A SPECIMEN PAGE FROM HARVEY'S WILL WITH SIGNATURE IN LOWER RIGHT HAND CORNER.

Harvey's rare letter to Riolan, several editions of "De Generatione Animalium" (including the first) and of his "Opera Omnia" were exhibited in a separate cabinet, together with an original teacup and saucer from his household, bearing the Harvey coat of arms; also a copy of his will, books about his works, portraits, etc. An interesting scrap book prepared by Weir Mitchell contained a mass of documents and correspondence about various Harvey matters in which Mitchell had been interested. This was opened to display an original manuscript (power of attorney) of Baldwin Hamey's, an early Harveian orator.

The controversies that arose about the discovery soon after the publication of "De Motu" brought out many works pro and con. Early and late works of Riolan the younger, Primrose, Parisanus, Caspar Hofman (Harvey's fellow student at Padua), Gassendi, Vesling, Van der Linden, Heurnius, Wormius and other op-

([4] New Sydenham Society Translation of Harvey's "De Motu Cordis," Chapter XIV.)

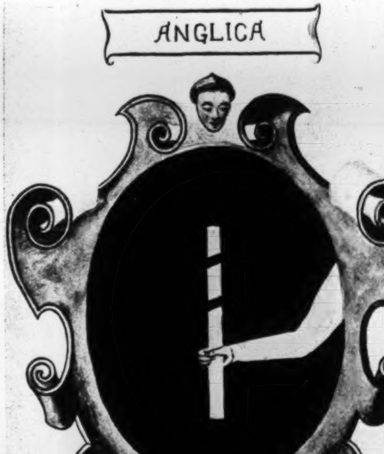

FIG. 3. HARVEY'S STEMMA IN THE AULA OF UNIVERSITY OF PADUA.

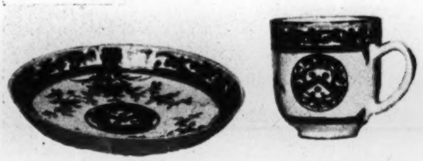

FIG. 4. HARVEY'S TEACUP AND SAUCER WITH COAT OF ARMS AND FLORAL DECORATION IN COLOR.

ponents, rubbed covers with Ent, Walaeus, Rolfink, Franciscus Sylvius, Drake (who published the first favorable dissertation), Bartholinus and the large group of supporters of the Harveian doctrine.

The lacteals as part of the vascular system are appropriately considered in this connection. Eustachius' mention of the thoracic duct has already been spoken of. More important is the more complete description by Gaspar Aselli,[5] the Pavian professor, of the lacteal system in the dog:

On the 23rd of July of that year (1622) I had taken a dog in good condition and well fed, for a vivisection at the request of some of my friends, who very much wished to see the recurrent nerves. When I had finished this demonstration of the nerves, it seemed good to watch the movements of the diaphragm in the same dog, at the same operation. While I was attempting this, and for that purpose had opened the abdomen and was pulling down with my hand the intestines and stomach gathered together into a mass, I suddenly beheld a great number of cords as it were, exceedingly thin and beautifully white, scattered over the whole of the mesentery and the intestine, and starting from almost innumerable beginnings. At first I did not delay, thinking them to be nerves. But presently I saw that I was mistaken in this since I noticed that the nerves belonging to the intestine were distinct from these cords, and wholly unlike them, and besides, were distributed quite separately from them. Wherefore struck by the novelty of the thing, I stood for some time silent while there came into my mind the various disputes, rich in personal quarrels no less than in words, taking place among anatomists concerning the mesenteric veins and their function. And by chance it happened that a few days before I had looked into a little book by Johannes Costaeus written about this very matter. When I gathered my wits together for the sake of the experiment, having laid hold of a very sharp scalpel, I pricked one of those cords and indeed one of the largest of them. I had hardly touched it, when I saw a white liquid

[5] Willis places Aselli at Bologna, Power & Thompson at Padua, the majority at Pavia. He is said by Dezeimeris to have lived mostly in Milan where he performed his immortal experiment.

> like milk or cream forthwith gush out. Seeing this, I could hardly restrain my delight, and turning to those who were standing by, to Alexander Tadinus, and more particularly to Senator Septalius, who was both a member of the great College of the Order of Physicians and, while I am writing this, the Medical officer of Health, "Eureka" I exclaimed with Archimedes, and at the same time invited them to the interesting spectacle of such an unusual phenomenon. And they indeed were much struck with the novelty of the thing. ["De Lactibus," Mediolani, 1627.]

Pecquet of Dieppe deserves an important place, both for his amplification and correction of Aselli's discovery and as the first important Frenchman to accept Harvey's discovery unreservedly. Lower's "Tractatus de Corde," in the attractive Elzevir edition, supports Harvey by showing not only the difference in color of the blood in the pulmonary artery and aorta, but that the systemic blood also became dark when the trachea was occluded and light again when the trachea was released. His description of the scroll-like structure of the myocardium, too, is well worth studying.

The final link in the chain forged by Harvey, the passage of the blood from arterioles to venules, was provided in 1661 by Malpighi, who by an odd coincidence was born the year of the publication of "De Motu." This was described in his work on the lungs, "De Pulmonibus Observationes Anatomicae," in the form of a letter to his former master Borelli, as follows:

> Something still more wonderful than the above appearances [of the frog's lung] which relate to mere structure and build is disclosed by microscopic observation. For, while the heart is still beating, two movements contrary in direction though accomplished with difficulty are observed in the vessels so that the circulation of the blood is clearly laid bare; and indeed the same may be even more happily recognized in the mesentery and in other larger veins contained in the abdomen. And thus by this impulse the blood is showered down in minute streams through the arteries, after the fashion of a flood, into the several cells, one or other conspicuous branch passing right through or leaving off there, and the blood, thus repeatedly divided, loses its red colour, and, carried round in a sinuous manner, is poured out on all sides until it approaches the walls, and the angles and the absorbing branches of the veins.
>
> The power of the eye could not be carried further in the opened living animal; hence I might have believed that the blood itself escaped into an empty space and was gathered up again by a gaping vessel and by the structure of the walls. But an objection to this view was afforded by the movement of the blood being tortuous and scattered in different directions and by its being united again in a determinate part. My doubt was changed into certainty by the dried lung of the frog which to a very marked extent had preserved the redness of the blood in very minute tracts (which were afterwards found to be vessels) where by the help of our more perfect glass there met the eye no longer scattered points resembling the skin which is called *Sagrino*, but vessels joined together in a ring-like fashion. And such is the wandering about of these vessels, as they proceed on this side from the vein and on the other side from the artery that the vessels no longer maintain a straight direction, but there appears a network made up of the continuations of the two vessels. This network not only occupies the whole area but extends to the walls, and is attached to the outgoing vessel, as I could more abundantly and yet with greater difficulty see in the oblong lung of the tortoise, which is equally membranous and trans-

> parent. Hence it was clear to the senses that the blood flowed away along tortuous vessels and was not poured into spaces, but was always contained within tubules, and that its dispersion is due to the multiple winding of the vessels. Nor is it a new thing in Nature to join to each other the terminal mouths of vessels, since the same obtains in the intestines and other parts; and, indeed, what seems more wonderful, she joins together by a conspicuous anastomosis the upper and lower terminations of veins as the most learned Falloppius has very well observed.
>
> In order, however, that you may more easily grasp what I have just stated, and follow it with your own eyes, ligature with a thread at the spot where it joins the heart, the protruded and turgid lung of a frog whose body has been laid open, doing this while a copious supply of blood is flowing through the whole of it.
>
> This even when dried will preserve its vessels turgid with blood. And this you will see exceedingly well if you examine it with a microscope of a single lens against the horizontal sun. Or you may adopt another method of seeing these things. You will place on a transparent plate the lung, illuminated from below by the light of a lamp conducted through a tube and you will bring to bear upon it a microscope of two lenses. In this way the vessels distributed in a ring-like fashion will be disclosed to you. By the same arrangement of the instrument and the light you will observe the movement of the blood in the vessels lying in the field of view. And you will yourself be able, with different degrees of light which escape description by the pen, to devise other things. Concerning the movement of the blood, however, one thing presents itself as worthy of your speculation. The auricle and heart being ligatured and so all movement and impulse which might be conveyed from the heart to vessels still connected with it being removed, the blood still flows towards the heart along the veins and distends these by its movement and copious supply; and this lasts for several hours. At the end however, especially if it be exposed to the sun's rays, it is not the subject of the same continued movement but as it were of alternating impulses; the blood, moving to and fro, progresses and then recedes along the same way. And this takes place also even when the heart and auricle have been removed from the body.
>
> Turning therefore to the former problems demanding solution, it may, by analogy, and from the simplicity which Nature uses in all her works, be concluded from these results that that network which I once thought to be nervous in nature is really a vessel attached to the vesicles and sinuses carrying thither the mass of the blood or carrying the same away, and that although in the lungs of the more perfect animals a vessel seems sometimes to leave off and to gape in the middle of the network of rings, yet it is probable that, as in the cells of the frog and the tortoise, the vessel in question is prolonged further into very small vessels after the form of a network, although these on account of their exquisite fineness escape our senses.

It was almost a century later that Lazzaro Spallanzani succeeded in applying Malpighi's discovery of the capillaries of the frog to a warm-blooded animal:

> Long have I been burning with curiosity to discover the circulation in warm-blooded animals, and to grasp it as completely as in the case of the cold-blooded; hence these vessels [umbilicals of the chick] attracted my observation more than any others, and invited my consideration, because they belonged to the said animals. Since the room in which I found myself was insufficiently lighted, and I was determined at all costs to satisfy my curiosity, I decided to examine the egg in the open, under direct sunlight. After fixing it in the apparatus of Lyonet [a small microscope used by Spallanzani]

I turned the lens upon it, and, notwithstanding the strong light that surrounded me, was enabled by focussing my eyes, to see plainly how the blood flowed in the entire circuit of the arterial and venous umbilical vessels. Thrilled with this unexpected joy, I felt that I, too, might exclaim, "'I have found it!' I have found it!" I made this discovery in May, 1771, and employed myself in the summer vacation of that year with its development.

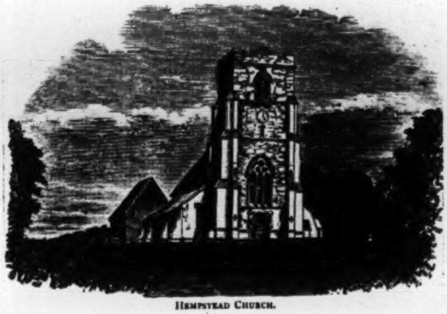
HEMPSTEAD CHURCH.

FIG. 5. THE CHURCH AT HEMPSTEAD, ESSEX, IN WHICH HARVEY WAS BURIED.

In the modern section of the exhibit, appropriate pages were opened or photostated from general works such as Garrison's "History of Medicine," Osler's "Evolution of Modern Medicine," Foster's "History of Physiology, "etc. The various special treatises such as Flourens, Richet, Paget, Willis, J. G. Curtis, J. M. Da Costa, Tollin, Ceradini and others were included.

Among the modern commentators will be found Tollin's booklets, claiming to prove that Columbus plagiarized his description of the pulmonary circulation from a copy of Servetus' "Restitutio Christianismi," that he had read; also Ceradini's publications arguing contrariwise. Few will agree with the latter at least that Servetus borrowed from Columbus, nor will they be inclined to follow his view that Sarpi, the Venetian theologian and pupil of Fabricius, not only discovered the function of the valves of the veins but had grasped the secret of the circulation. The destruction of the disputed manuscript by fire in 1769, probably prevented forever the possibility of deciding this point. The theory is based chiefly on the fact that Vesling told Bartholinus that he had seen an autograph of Sarpi's describing the circulation, but it is more likely that this was but a transcript of some of Harvey's work.

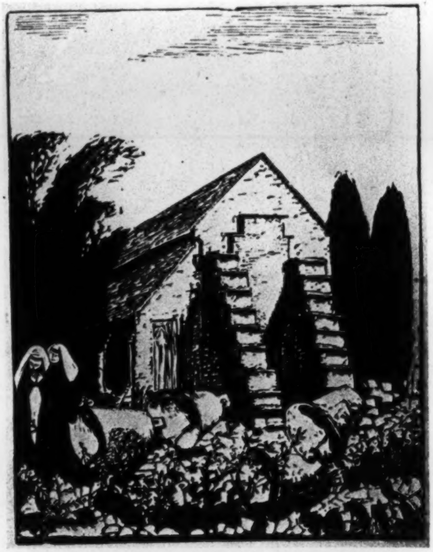

FIG. 6. WOODCUT OF CHURCH AT HEMPSTEAD, ESSEX, AFTER FALLING OF MAIN TOWER. EFFORTS ARE NOW BEING MADE TO COLLECT FUNDS FOR RESTORATION OF TOWER.

A long run of Harveian Orations, including those by Osler in 1906, Rolleston (the father of the orator of our tercentenary) in 1873, Richard Mead, Gull, Quain and many other celebrities, affords a wealth of material for the Harvey student. This series also permits an interesting survey of the decline of Latin as the medium of scientific communication, including a transition period in the early part of the 19th century where the oration, delivered in Latin, was printed in both Latin and English.

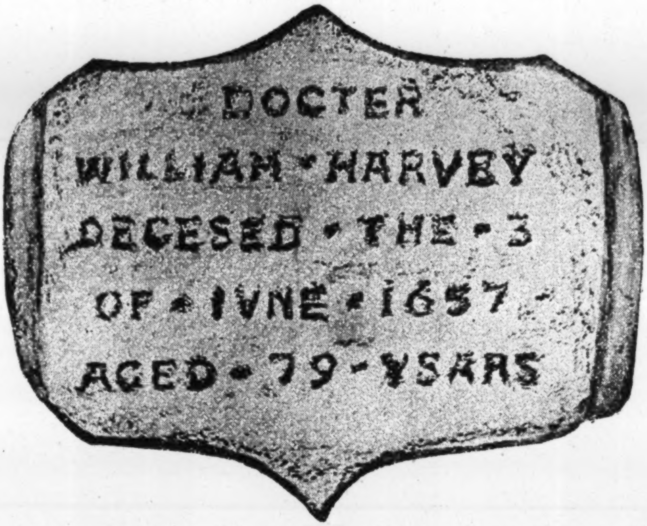

FIG. 7. RUBBING MADE BY DRS. RICHARDSON AND S. WEIR MITCHELL FROM PLATE ON HARVEY'S LEADEN SARCOPHAGUS.

The pictures in the already existing Harvey corner of the College included a replica of the famous oil at the Royal College of Physicians, a smaller head in oils in the style of Rubens, a monochrome mural sketch by E. F. Faber, and a colored copy of the famous "stemma" in the University of Padua. Engravings and photographs of all known likenesses of Harvey were to be found framed or laid on tables, together with a large collection by Weir Mitchell of photographs of Harvey's wife, his brother Eliab and wife, collateral descendants, the site of his residence, the church at Hempstead, Essex, where he was buried, his burial place in the church, rubbings from the tablets on his coffin and on the floor and wall of the Hempstead church, his various monuments and other matters connected with the great investigator and his discovery.

The following list of items exhibited contains occasional notations, mostly explaining the reason for the item being included in the exhibit. It is hoped that, like the translated passages previously included, they may afford convenient approach to original sources for anyone interested in the progress of thought about the circulation of the blood.

LIST OF HARVEIANA IN THE TERCENTENARY EXHIBIT OF THE COLLEGE OF PHYSICIANS, PHILADELPHIA, MARCH 22 AND 23, 1928

SCHEME OF LIST

I. BOOKS
  A. Harvey's works:
    1. Editions of Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus.

2. Editions of Exercitationes duae Anatomicae de Circulatione Sanguinis ad Jo. Riolanum, Filium.
3. Editions of Exercitationes de Generatione Animalium.
4. Editions of Opera Omnia.
5. Prelectiones Anatomiae Universalis.

B. Predecessors of Harvey (arranged chronologically).

C. Contemporaries of Harvey (arranged alphabetically).

D. Modern Commentators.
1. Harveian orators (arranged chronologically).
2. Commentators (arranged alphabetically).

II. PAINTINGS, ENGRAVINGS, PHOTOGRAPHS, ETC.

III. MISCELLANEOUS ITEMS.

I. BOOKS

A. HARVEY'S WORKS.*

1. EDITIONS OF EXERCITATIO ANATOMICA DE MOTU CORDIS ET SANGUINIS IN ANIMALIBUS.

(1) Latin. 72 pp., 4°, Francofurti, Fitzeri, 1628.

(2) Latin. [6], 267, 84 pp., 2 pl., 4°, Lugd. Batav., Maire, 1639.

(3) Latin. [10], 227 pp., 24°, Patavii, Sardi, 1648.

(4) Latin. F°, [Amsterdami, Blaev, 1645], [In: Spigelius, A. Opera. 1645. I, XXXVII–LXIV].

(5) Latin. 267 pp., 12°, Lund. Batav., Maire, 1647. [In: Recentiorum Disceptationes de Motu Cordis. 1647].

(6) Latin. [38], 215 pp., 24°, Roterodami, Leers, 1648.

(7) English. [38], 112, [20], 123 pp., 8°, London, Lowndes, 1653.

(8) Latin. [38], 464, [24] pp., 1 pl. 12°, Londini, Danielis, 1660. [Engr. t. p. 1661].

(9) Latin. [28], 285, [26] pp., 16°, Roterodami, Leers, 1671.

(10) English. [24], 107 pp., port. 8°, London, Lowndes, 1673.

(11) Latin? F°, Geneva, 1685. [In: Le Clerc, D., et Manget, J. J. Bibliotheca Anatomica. 1685, II, 37–63].

(12) Latin. [18], 178 pp., 1 pl., 16°, Bononiae, Longhi, 1697.

(13) Latin. [12], 167, [4] pp., 4°, Lugd. Batav., van Kerkchem, 1736.

(14) Latin. [12], 170 pp., 4°, Lugd. Batav., Marie, 1737.

(15) Latin. x, [2], 299 pp., 8°, Glasguae, Urie, 1751.

(16) Latin. XVIII, 250 pp., 2 pl., 8°, Edinburgi, Carfrae, 1824.

(17) German. 4°, [Stuttgart, Enke, 1878]. [In: Bass, J. William Harvey.*** 1878; pp. 49 to 108].

(18) French. III, 287 pp., 8°, Paris, Masson, 1879.

(19) English. XX, 147 pp., 12°, London, Bell, 1889.

(20) English. x, 72, [2], 91 pp., 4°, Canterbury, Moreton, 1894.

(21) English. XXX, 239 pp., 16° London, Dent, [1906].

(22) German. 120 pp., 12°, Leipzig, Barth, 1910.

2. EDITIONS OF EXERCITATIONES DUAE ANATOMICAE DE CIRCULATIONE SANGUINIS AD JO. RIOLANUM, FILIUM.

(1) Latin. Cambridge, 1649. 12°, Title. 124 pp. Cantabridgiae, Danielis, 1649.

(2) Latin. F°, Geneva, 1685. [In: Le Clerc, D., et Manget,

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* Taken from C. P. Fisher's brochure, q.v. The Latin 12mo of 1636 (Leiden) the 16mo of 1654 (Leers, Roterdam) and 4to of 1739 (Marie, Leyden) the Dutch 24mo of 1650 (Last, Amsterdam), and the French 16mo of 1892 (Paris, Masson) were not in the College collection. Keynes has recently described sixteen other editions, including two tercentenary publications.

J. J. Bibliotheca anatomica, 1685, II 64–70].

(3) English. 86 pp., 8°, London, Leach, 1653.

(4) English. [In his: Circulation of the Blood. 1906, pp. 109–130].

3. EDITIONS OF EXERCITATIONES DE GENERATIONE ANIMALIUM: QUIBUS ACCEDUNT QUAEDAM DE PARTU; DE MEMBRANIS AC HUMORIBUS UTERI; ET DE CONCEPTIONE.

   (1) Latin. [24], 301 pp., port., 4°, Londini, Pulleyn, 1651.
   (2) Latin. 568, [6], pp., 24°, Amstelaedami, Elzevir, 1651.
   (3) Latin. [30], 415, [6] pp., port., 24°, Amstelodami, Jansson, 1651.
   (4) Latin. [26], 3888, [2] pp. 16°, Amstelodami, Ravesteyn, 1651.
   (5) English. [44], 566, [2] pp., port., 12°, London, Young, 1653.
   (6) Latin. [26], 388, [4] pp., 16°, Amstelaedami, Ravesteynium, 1662.
   (7) Latin. [32], 604, [6] pp. 24°, Patavii, Frambotti, 1666.
   (8) Latin. [34], 582, [4] pp., 16°, Hagae-Comitis, Leers, 1680.
   (9) Latin. [120] pp., F°, Geneva, 1685. [In: Le Clerc, D., et Manget, J. J. Bibliotheca Anatomica. 1685. I, 595–728].
   (10) Latin. [20], 404, 38 pp., 4°, Lugd. Batav., van Kerckhem, 1737.

4. EDITIONS OF OPERA OMNIA.

   (1) Latin. 2 v. [12], 170 and [20], 204, [38] pp., 8°, Lugd. Batav., van Kerckhem, 1737.
   (2) Latin. [8], XXXVIII, 673 pp., port., 4°, London, Bowyer, 1766.
   (3) English, XCVI, 624 pp., 8°, London, Sydenham Soc., 1847.

5. PRELECTIONES ANATOMIAE UNIVERSALIS.

   (1) Latin. VIII, 98 pp., 196 photolith. pl., 4°, London, Churchill, 1886.

B. PREDECESSORS OF HARVEY.*

1. Hippocrates 460–377 B.C. [Tractatus de Natura Hominis et alia Opuscula, Andrea Brentio Interprete]. [40] pp., 4°, Romae, Stephanus Planck, circa 1480.

> "Procedunt quoq[ue] a ve [n]-triculo per corpus aliae per m[u]ltae et uariae uenalae ramulor[um] mom per q[ua]s alimentu[m] corpori transmittit."

1a. Hippocrates [Opera]. Romae, in aedibus Francisci minitii Calvi, 1525.

2. Aristoteles 384–322 B.C. De Respiratione, Chaps, IX and XX, [De Natura Animalium.*** Circa 1475].

> "The pulsation of the heart depended on a sudden expansion or puffing up of the material supplied for the elaboration of the blood by the food digested in the stomach . . . The arteries pulsated synchronously with their source and the blood flowed alternately from the vessels to the heart, from the heart to the vessels, the valves at the orifices of these regulated the current." (Willis, p. 14.)

3. Galeni [130–200] Operum Quintus Tomus etc. Froben, Basileae, 1549.

> "The history of the discovery of the circulation of the blood begins with Galen (125–201 A.D.) who by his vivisections exposed the errors of the Alexandrine school under Erasistratus (300 B.C.), who held that the left portion of the heart and the arteries were empty and that they, communicating by means of the small bronchi with the arteria aspera (trachea) serve to convey the spirit of life (pneuma) to the various parts of the body, to animate them and that the veins alone contain blood with which to nourish the entire body" [Hemmeter].

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* Arranged chronologically.

4. [Lionardo da Vinci (1452–1519)] In: Leonardo as Anatomist by H. Hopstock, in: Studies in the History and Method of Science, edited by Charles Singer. Oxford, Clarendon Press, 1921, I, 151–191.

"More than a quarter of all the anatomical and physiological drawings in the six quaderni deal with the heart and its cavities" (Hopstock). Lionardo speaks of: "Il continuo corso che fa il sangue per le sue vene," and he notes that: ". . . il sangue che torna indietro" [to the heart] differs from that "che riserra le porte del cuore." Even from the manuscript fragments that have already been deciphered it is obvious that Lionardo's knowledge was far in advance of his time. Though he is said to have used the term *motu girando* in connection with the blood, he seems to have adhered more to the Galenic conception of ebb and flow.

5. [Guinterius (Winter) of Andernach, 1487–1574]. Claudii Galeni/Pergameni de Ele/mentis ex Hippocratis/sententia libri duo/ Guinterio Joanne Andernaco interprete/Parisiis/apud Simonem Colinaeum/1528.

There is said to be a copy of this in the British Museum but it is not in the Catalogue, Surgeon General's Library. This copy is bound with another commentary by Guinterius on Galen's "Libri tres. Primus de Facultatum . . . Secundus quod Animi Mores . . . Tertius de Propriorum . . . " also said not to be in the Surgeon General's Library.

Guinter's connection with the discovery of the circulation is as the teacher of Vesalius and Servetus. He was well informed of the anatomy of the heart [Inst. Anatomicarum ex Galeni Sententia, Libri III, Basil, 1539], perhaps through the work of his pupils. He was physician to Francis I, and Henry II of France.

6. [Sylvius, Jacobus 1478–1555.] Iacobi Sylvii/Ambiani Meeici/et Professoris Regii/Parisiensis/Opera Medica.****/Genevae/Sumptibus Iacobi Chouer/Anno M.DC.XXX.

An obstinate Galenist who would never admit the Harveian doctrine; not to be confused with Franciscus Sylvius (de la Böe). An eponymic anatomist of distinction and teacher of Vesalius.

7. Vesalius, Andreas (1514–1563). De humani corporis fabrica libri septem. Basileae, Oporini, 1543.

Vesalius' objection to Galen's view that the blood passes from the right ventricle to the left through a permeable septum is expressed in these words: "Vtcu[n]q[ue], interim hae fouee sint co[n]spicue nulle tamen quod sensu co[m]prehendi potest, ex dextro uentriculo in sinistru[m] per eorunde[m] septu[m] permea[n]t***."

8. [Servetus (1509–1553)]. De Trini/tatis erroribus/Libri Septem./Per Michaelem Seruete, aliàs Reues ab Aragonia/Hispanum. 1531. Jo. Secerius, Hagenau, Printer.

A contemporary edition of a theological work by the author of "Christianismi Restitutio." Are there perhaps some physiological statements buried herein?

9. Servetus Villanovanus [Michael]/ Christianismi Restitutio, 1553, pp. 169–172/[Nuremberg Imprint] 4 pp.

A typewritten transcript of the passages pertaining to the pulmonary circulation. For translation see text, also Willis p. 77. According to Osler the three extant copies of this work are in the Bibliothèque Nationale of Paris, the Imperial Library of Vienna and an imperfect copy in the University Library of Edinburgh. In 1791 the Vienna copy was reprinted at Nuremberg (1780 according to Surg. Gen. Catalogue).

10. [Servetus] Historia/Michaelis/Serveti . . . A. O. R. MDCCXXVII. D. XIX. Decembris./Placido Doctorum. Examini./Publice. Exponit./ AVCTOR. Henricus ab Allwoerden./ Stadensis. Theol. Cultor./Helmstadii./Stanno. Buchholtziano./

A rare eighteenth century life of Servetus with a copper engraving showing his portrait and a representation of his being burnt at the stake. Though this book contains none of his work, there are interesting abstracts in French from his trial for heresy.

11. Historie/Van/Michael Servetus den Spanjaart./Te Rotterdam/By Jan Daniel Beman,/MDCCXXIX.
A Dutch edition of the previous work.

12. [Columbus, 1516?–1559] Realdi Columbi/Cremonensis,/In almo Gymnasio Romano/Anatomici celeberrimi,/De re Anatomica/Libri XV./Venetiis, Ex Typographia Nicolai Beuilacquae, MDLIX/Cum Privilegiis.

13. [Another copy]. Parisiis,/In officina Ioannis Foucherij Iunioris, sub signo Aquilae****1562.

See text for several quotations concerning the circulation.

14. [Cesalpinus 1524–1563] De Plantis/Libri XVI./Andreae Caesalpini/Aretinu/*** Florentiae,/Apud Georgium Marefcottum, MDLXXIII.

See text for quotations concerning the circulation.

15. [Eustachius (1520–1574)] Bartholomoei' Eustachii/Sanctoserverinatis Medici/ac Philosophi/Opuscula Anatomica./Quorum numerus & argumenta auersa pagina indicabit./Venetiis, 1564.

"Eustachius had recognized the thoracic duct in the horse in 1564 and had even detected some of its valves, but this exerted no influence and was practically lost until Aselli's description of the lymphatics [lacteals] in the dog's mesentery in 1622. Eustachius also described the valve that bears his name in the right auricle."

16. Canano, Joannes Battista (1515–1575) Musculorum Humani Corporis Picturata Dissectio [Ferrara, 1541?]. Facsimile edition by Cushing and Streeter. Lier and Co., Florence, 1925.

Canano is thought to be the earliest discoverer of the valves of the veins and is said to have informed Vesalius of his discovery at their meeting at Ferrara in 1542. In Vesalius' Fall. Exam. 83. he says: "At Regensburg (in 1546) when I attended in consultation with Canano the sick Lord Fr. d'Esk, he informed me that he had observed, in the lumen of the azygos and renal veins, and in those veins that overlie the upper portion of the os sacrum, membranes like those guarding the orifices of the vena arterialis and the great artery—and these, he asserted, opposed the reflux of the blood."

17. [Fabricius ab Aquapendente, 1537–1619], Fabricii/AbAqua/pendente Medici/Celeberrimi,/Atque in Florentissima Academia Patsuina Professoris Primarij,/Medicina Practica./Parisiis/Apud Clodoveum Cottard,/via Jacobe a, sub signo duorum Angelorum./Anno M.DC.XXXIV.

The teacher of Harvey at Padua. He was apparently the first to have seen the valves of the veins. He also experimented with vein ligations. In "De Venarum Ostiolis" (Parav., 1603) he states that he discovered these valves in 1574, and apparently considered that they had never been seen before: "Quis enim unquam opinatus fuisset intra venarum cavitatem reperiri posse membranulas et ostiola? cum praesertim venarum cavitas quae ad deferendum sanguinem in corpus universum erat comparata libera, ut libere sanguis permeare futura esset."

18. [Rabelais 1494–1553] Les/Oeuvres/de M. François Rabelais/Docteur en Medecine/Sphere MDCLXVI. L. and D. Elzevier, Amsterdam.

"A critical study of the passages from Rabelais, which Paquelin cites, (Rev. de Lit. medic., 1878, p. 499) proves that the alleged French discoverer brings nothing new, nothing which was not already stated by Galen" (Hemmeter).

19. Ruini, Carlo, Anatomia del Cavallo, infermita e suoi remedii. 2 Ed. 1599.

In the Surgeon General's Library. See text for a lengthy translated quotation.

20. [Aselli, 1580–1626] De Lactibus sine Lacteis Venis/Quarta Vasorum Mesaraicorum genere/Novo Invento/Gasparis Asellii Cremon Anatomici Ticinensis./Dissertatio. Mediolanj/Apud Io: Baptam Bidellium/MDCXXVII.

See text for quotation of passages concerning the discovery of the lacteals in 1662. Professor at Bologna.

C. CONTEMPORARIES OF HARVEY*

1. [deBach] Jacobi de Bach/Dissertatio de corde/Annexa/appendix pro circulatione/Harveiana/Roterodami, Leers 1648 (transl. Eng. 1653).

Bound with the Rotterdam edition of 1648 of Harvey's "De Motu." An early Dutch supporter of Harvey. See Dedication to Harvey: "It is true that it adds little glory to your name which is already known all over Europe."

2. Baglivi, Georgii, (1668–1707) Opera Omnia/Lugduni./Sumptibus Anisson, & Joannis Posuel./M.DCCXIV.

The collected works of the Italian biologist who was said to be most prominent in placing Realdus Columbus above Cesalpinus and Harvey as discoverer of the circulation of the blood. I have not been able to locate this passage.

3. Bartholinus, Thomas, (1616–1680) De Lacteis Thoracicis/[See p. 33 in]: Messis Aurea/Triennalis,/Exhibens;/Lugduni Batavorum/Ex Officina Adriani Wyngaerden/1654.

With his father, Caspar, an early supporter of Harvey. Discovered lymphatics, in 1652, and regarded his discovery as favorable to Harvey's theory of the circulation.

4. Thomae Bartolini./Casp. Fil./Anatomia/Reformata/Ludg. Batav. et Roterod./1669.

With frontispiece portrait and curious title page of a flayed individual.

5. [Chirac, Pierre, 1650–1732] Petri/Chirac/Consiliarii/Medici, et Professoris/Regii Monspeliensis. De/Motu Cordia/Adversaria Analytica./Monspelii/Apud Joannem Martel, Regis,/M.DC.XCVIII.

He adopted certain theories which were in vogue in his time, but has made a faulty application of mathematics to the motion of the heart (Bayle).

6. [Conring, Hermann, 1606–1681]. Hermannus Conringius/ Frisius/ Medicinae Profess. in Acad. Iulia,/De/Sanguinis/Generatione,/et/Motu Naturali./
****Ludg. Bat. Apud Franciscum Hackium; Amsterod. Ludovicum Elzevirium, 1646.

Professor of medicine at Helmstaedt, a remarkable savant, author of many works on many subjects, was the first to teach the circulation of the blood at Helmstaedt (Bayle).

7. [Descartes, Réné]. Renati Des-Cartes/Tractatus/de/Homine,/et/de/Formatione Foetus, Amstelodami,/Apud Danielem Elzevirium/1677.

One of the earliest textbooks of physiology, in which Descartes for the most part warmly supported Harvey's views (see pp. 203–204). Foster considers this the first textbook of physiology written after the modern fashion, even though written more as an exposition of part of his philosophical system than as a contribution to physiological knowledge.

8. [Deusingius, Antoine, 1612–1666] De/Motu Cordis/et/Sanguinis/

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* (Arranged alphabetically.)

Apud Franciscum Bronckhorst/ 1655.

The author even at this early date finds it necessary to apologize for adding to the number who have written about the circulation of the blood.

9. [Drake] Roger Drake, M.D.,/Contra/ animadversiones/Jac Primerosii/ in theses quas ipse pro sanguinis/ motu circulari/sub praesidio Jo Walaei xxx in Recentiorum/Disceptationes/de Motu Cordis.*** Lug. Bat. Maire, 1647.

The first of many inaugural dissertations on this subject.

10. [Ent, Sir George, 1603–1689] Apollogia/Pro/Circuitione Sanguinis/ Qua respondetur/Aemylio Parisano/Medico Veneto./Auctore/ Georgio Entio./***** Londini,/ Typis M.F. Impensis *Gualteri Kettilby* ad Insigne Capitis Episcopalis in Coemeterio, 1685.

Sir George Ent, who had known Harvey well, was President of the Royal College of Physicians, and is mentioned by Dryden in his "Epistle to Dr. Charleton:"

The circling streams once thought but pools of blood—
(Whether life's fuel or the body's food),
From dark oblivion Harvey's name shall save
While Ent keeps all the honor that he gave.
[Norman Moore, p. 69.]

Ent damages the claims for Sarpi as the discoverer of the circulation by recounting how the Venetian legate, returning from London to Venice took with him a copy of "De Motu" which he lent to Sarpi, whose transcription was later thought by his heirs to be an original.

11. Georgii Entii/Eq. Aur. Med. Doct./ & Coll. Lond. Socii,/Opera Omnia/Medico-Physica, Lugduni Batavorum,/Apud Petrum Vander Aa, Bibliop./1687.

With frontispiece portrait.

12. [Glass C. P.] Exercitatio Anatomico-Physiologico-Medica,/De/ Admirando San-/Guinis Circuitu, ****Euulgata/a/Christiano Philippo Glass,/Austriaco-Vienensi, Medic, C., 1736.

13. [Grove, Robert] Roberti Grovii/ Carmen/De/Sanguinis Circuitu/ A/Gulielmo Harvaeo Anglo,/Primum Invento./Londini,/Typis/ R.E. Impensis *Gualteri Kettilby*, ad Insigne/*Capitis Episcopalis* in Coemeterio D. *Pauli.*/1685.

Robert Grove, Bishop of Chichester, was at Oxford when Harvey was at Merton. "The poem describes in detail one of Harvey's demonstrations on a dog and is so circumstantial that I very little doubt the future bishop saw it" (Letter from Sir D'Arcy Power to Weir Mitchell, now in Library of College of Physicians, Philadelphia).

13a. Highmore, Nathaniel (1616–1685) Corporis Humani Disquisitio Anatomica in qua Sanguinis Circulationem . . . Prosequutus est. 4° Hagae-Comitis, S. Broun, 1651.

14. [Hofmann, Caspar, 1572–1648?] Casp./Hofmanni/Institutionum/ Medicarum/Libri VI./Lugduni/ Sumptib. Ioan-Ant. Huguetan/ M.DC.XLV./[With portrait on title page.]

Caspar Hofmann, who like Harvey had been a disciple of Fabricius at Padua, was with Riolanus, a chief opponent of Harvey; but it might be said that their very importance led to the earlier recognition of the truth of Harvey's doctrine. Harvey is said to have travelled to Germany to try to convince Hofmann of the truth about the circulation. Hofmann's most frequent references are to Hippocrates, Aristotle and Galen.

15. Leeuwenhoek, Anton van. Letter to Royal Society of London, Sept. 7, 1688: The true circulation of the blood, and also that the arteries and veins are continued blood vessels, clearly set forth.

16. Leichnerus, E. De cordis et sanguinis motu hypom nemata septem. Jenae, 1653.

17. [Lower, Richard, 1631–1691] Tractatus/De/Corde/Item/De Motu &

Colore Sanguinis, &/Chyli in eum Transitu./**** Authore/Richardo Lower, M.D./Editio tertia, & ultima./Amstelodami,/Apud Danielem Elzervirium/1671.

With 6 interesting plates. A very important work in the development of knowledge of the heart and circulation. In the chapter on structure, Lower was apparently the first to demonstrate the scroll like structure of the heart muscle. Chapter II concerns the motion of the heart; chapter III, the motion and color of the blood, chapter IV, one of the earliest discussions of transfusion; and chapter V discusses the chyle.

18. [Malphighi, Marcello, 1628–1689]. Marcelli Malpighii; Philosophi & Medici Bononiensis, / E / Regia Societate/Opera/Omnia,/**** Londini:/Apud Robertum Littlebury, via vulgo dicta Little/Brittain, MDCLXXXVII.

The proof of Harvey's concept of the circulation of the blood remained incomplete until Malpighi's demonstration of the capillary connection between arteries and veins in the lungs (1661). See lengthy translation in the text.

19. [Malpighi, Marcello] Epistolae/Anatomicae/Virorum Clarissimorum/Marcelli Malpighii/et/Caroli Fracassati/***** Amstelodami,/Apud Casparum Commelinum/1669.

20. [Nicolai] Henrici Alberti Nicolai/Med. Licent./De/Directione/Vasorum/Pro Modificando Sanguinis/Circulo/Diatriba/Mechan-Anatomica/Argentorati/Typis Simonis Kürsneri, Cancell. Typogr./Anno MDCCXXV.

21. [Pecquet, Jean, of Dieppe, 1622–1674]. De Venis/Tam/Lacteis Thoracicis,/Quam Lymphaticis,/ *** Genuae, 1654/Typis, & impensis Benedicti Guaschi./

Discoverer of the thoracic duct and receptaculum chyli. The first French scientist of distinction to accept Harvey's view on the circulation. See his "Experimenta nova Anatomica," Paris, 1641.

22. [Plempius, 1601–1671] Vopisci Fortunati/Plempii/Fundamenta/Medicinae/Editio quarta/Lovanii, Nempaei, 1664.

At first an opponent of Harvey, he later retracted and became a supporter of the theory of the circulation, 1652. Plempius was a professor at Louvain.

23. [Primrose.] Primerosius.

1. Animadversiones in Joh Walaei disputationem medicani quam pro circulatione sanguinis Harveiana proposuit.
2. Animadversiones in theses quas pro circulatione sanguinis in academia vetraje et ense Henricus le Roy.

The well known author of "De Vulgi Erroribus." His crude attack of Harvey's doctrine produced Drake's inaugural dissertation, q.v., instigated by Fr. Sylvius, q.v. Both these are included in "Recentiorum Disceptationes de motu cordis." Lug. Bat., Maire, 1647.

24. [Regius 1638–1679] Du Roy, Henricus. Spongia qua eluuntur sordes animadversiones quas Jacobus Primirosius, adversus theses pro circulatione sanguinis . . . [In Recent. Discep. de motu cordis., Lug. Bat., Maire, 1647.]

25. [Riolan, Jean, 1577–1657.] Opuscula/Anatomica/***De/Motu Circulatorio/Sanguinis in Corde/Accessere/Notae in Joannis Walaei duas Epistolas/de Circulatione Sanguinis./Authore Joanne Riolano Professorum/Regiorum Decano./Londini,/Typis Milonis Flesher./1649.

"Harvey owed his success to the opposition of the Parisian anatomist (Riolan) who, upon Fabricius' death, was considered the greatest authority in Europe" (Ceradini). See among Harvey's works: "Exerc. Anat. de Circ. Sang. ad Joannem Riolanum filium," one of the few occasions on which he replied to his critics.

26. [Riolan] Encheiridium/Anatomicum/et Pathologicum/adornatum a/Joanne Riolano Filio/Cum Figuris/Lugduni Batavor./Ex officina Adriani Wyngaerden, 1649.

27. [Riolan] Ioannis/Riolant/Filii/****Opera Anatomica/Vetera, recognita & auctiora;/Lutetiae Parisiorum,/Semptibus Gaspari Meturas, via Iacobaea,/sub signo SS. Trinitatis, prope Maturinenses./1649.

28. [Riverius 1589–1655] Lazari/Riverii/***Opera Medica Unversa /Lug. Huguetan, 1679.

Willis says that Riverius, Professor of Medicine at Montpellier, was summoned by an adherent of the old school to resign his chair on account of his public defence of the Harveian theory.

29. [Rolfingius 1599–1673] Guerneri Rol-/Fincii, Phil. & Med. Doct. &/Prof. Publici,/Dissertationes/Anatomicae/***Noribergae,/Michael Endterus Curabat./1656.

An industrious Professor of Anatomy at Jena, who defended the Harveian doctrines. His zeal for securing autopsies was so great that the word "rolfinken" was coined to designate stealing a body for dissection.

30. [Schlegel] Pauli Marquarti Slegelii/Med. Hamburgensis,/De/Sanguinismotu/Commentatio,/in qua/praecipue in Joh. Riolani, V.C. sententiam inquiritur,*** Hamburgi,/Typis Jacobi Rebenlini, sumptu/Zach. Hertelii, Bibliob. Hamb., MDCL.

The first and ablest supporter of Harvey's views in Germany. Directed primarily against Riolan, this essay is an able discussion of the whole subject. It seems to have appealed especially to Harvey who sent him a copy of his "De Generatione" with a letter that has been preserved. See Willis, pages 251 and 262.

31. [Spallanzani, Lazzaro, 1729–1799] Experiments/Upon the/Circulation of the Blood,/*** By the Abbe Spallanzani./Translated into English and Illustrated with/Additional Notes;/By R. Hall, M.D. &c./London:/Printed from J. Ridgway, York-Street, St. James's Square, By J. D. Dewick, Aldersgate-Street/1801.

32. [Smith, John] The/Pourtraict/of/Old Age./By John Smith, M.D./The Second Edition Corrected./London,/Printed by J. Macock, for Walter Kettilby, at the Bishops/Head in St. Pauls Church-Yard, 1666.

Quoted in Sir Humphry Rolleston's address on Harvey and his contemporaries, q.v.

33. [Sylvius, Franciscus] Francisci Deleboe, Sylvii/Opera/Medica,/*** Amstelodami,/Apud Danielem Elsevirium,/et/Abrahamum Wolfgang/1680.

Recognizing the importance of Harvey's discovery, he converted Vorstius and Walaeus to be supporters of Harvey's doctrine.

34. [Vesling, 1598–1649] Joannis Veslingii/Equitis, Professoris quondam Patavini, &c./Syntagma/Anatomicum,/****Editio Secunda/Amstelodami,/Apud Joannem Janssonium a Waesberge, & Elizeum/Weyerstraet. 1666.

In his Observ. Anat. et Epist. Med. (Hof Com., 1640; Hafniae, 1644), Vesling, Professor at Padua, writes Harvey saying how much he had profited by his views, and how his earlier doubts, as to the identity of arterial and venous blood, had been cleared away.

35. [Walaeus, 1604–1649] Epistola/Johannis Walaei/de/Motu Sanguinis:/Thomam Bartholinum,/Casp. Filium./Bound with Casp. Bartholini/Institutiones/Anatomicae/Lug. Batavorum/Apud Franciscum Hackium/1641.

At first in opposition on theoretical grounds, he followed Fr. Sylvius' advice to try the matter out. He also set his pupil, Drake, q.v., to write the first inaugural thesis in support of Harvey's theory, which stimulated Primrose's crude and futile attack against Harvey's views.

D. MODERN COMMENTATORS.

1. HARVEIAN ORATORS,* London. (The dates without title have been filled in from The Index Catalogue of the Surgeon General's Library.)

1719. Pellet, T. Oratio Anniversaria Habita in Amphitheatro Collegii Regalis Medicorum Lond. in Laudem Benemeritorum et Bene Merentium de Medicina (The first Harveian oration listed in the Index Catalogue, Surgeon General's Library).
1720. Freind, J. Oratio Anniversaria in Theatro Collegii Regalis Medicorum Londin.*** (The author of the first History of Physick in English.)
1723. Mead, R. Oratio Anniversaria Harveiana*** ad diem Octobri MDCCXXIII.***
1727. Arbuthnot.
1729. Dod, P.
1731. Broxalme, N.
1733. Wood, G.
1735. Wilmot, E.
1737. Monro, J.
1741. Hopwood, R.
1742. Hoadley, B.
1745. Cotes, C. Oratio Anniversaria.***
1746. Battie, G.
1747. Hawley, G.
1748. Mead, R. Oratio Anniversaria Harveiana.
Nicholls, F. Oratio Anniversaria Theatro Collegii Medicorum Londinensium; decimo quinto calend. Novembris, ex Harveii Instituto, ad Socios Habita. [Bound with his "Compendium Anatomico-Oeconomicum."*** 1746].
1751. Browne, W.
1754. Batt, J. F. Oratio Anniversaria in Theatro Collegii Regalis Medicorum Londin.***
1755. Taylor, R.
1756. Conyers, R.
1757. Conyers, R.
1759. Akenside, M. Oratio Anniversaria quam ex Harveii Instituto in Theatro Collegii Regalis Medicorum Londinensis die Octobris XVIII a MDCCLIX Habuit.
1760. Brocklesby, R. Eulogium Medicum sive Oratio Anniversaria Harvaeana.***
1761. Baker, G. Oratio ex Harveii Instituto Habita in Theatro Collegii Regalis Medicorum Londinensis.
1763. Cadogan, G.
1764. Cadogan, G.
1768. Warren, R.
1769. Adee, S. Oratio.***
1770. Relham, A. Oratio.***
1771. Green, J. Oratio.***
1774. Jobb, R.
1775. Monro, D.
1778. Duncan, A. Sr.
1785. Leigh, J. Experimental Inquiry into the Properties of Opium.***
1790. Ash, J.
1792. Cadajan, G.
1794. Latham, J.
1797. Bourne, R.
1800. Halford, Sir. H. Oratio in Theatro Collegii Regalis Medicorum Londinensis, ex Harveii Instituto, Habita die Octob. XVIII, an MDCCC.
1806. Pemberton, C. R.
1809. Heberden, W.
1817. Gibbes, G. S.
1819. Johnstone, J. Oratio Harveiana MDCCCXIX.
1825. Halford, Sir. H. Oratio in Collegii Regalis Medicorum Londinensis Aedibis Novis, Habita die Dedicationis, Junii XXV, MDCCCXXV.
1826. Warren, P.
1827. Bree, E.

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*Arranged chronologically.

1832. Huie, R.
1834. Monro, E. T.
1837. Halford, Sir H. Oratio in Collegii Regalis Medicorum Londinensis ex Harveii Instituto Habita die Junii XXV, an MDCCCXXXVII.
1839. Latham, P. M. Oratio ex Harveii Instituto Habita in Aedibus Collegii Regalis Medicorum Londinensis A.D. MDCCCXXXIX.
1845. Danbeny, C.
1848. Hawkins, F. Oratio ex Harveii Instituto in Aedibus Collegii Regalis Medicorum Habita die Junii XXIV, MDCCCXLVIII.
1849. Radeley, J. C.
1850. Wilson, J. A.
1851. Spurgin, J. Orationem ex Harveii Instituto in Aedibus Regalis Medicorum Collegii Londinensis III Nonas Julias MDCCLI. (*sic*).
1856. Roe, H.
1857. Copland, J.
1858. Wood, G. E. W. Oratio ex Harveii Instituto in Aedibus Collegii Regalis Medicorum Londinensis Habita die Julii x mo MDCCCLVIII.
1859. Aldis, C. J. B. Oratio ex Harveii Instituto in Aedibus Collegii Regalis Medicorum Londinensis Habita die XXIX Junii MDCCCLIX.
1860. Page, G. E. Oratio ex Harveii Instituto in Aedibus Collegii Regalis Medicorum Londinensis Habita die Junii MDCCCLX.
1863. Sutherland, A. J. Oratio ex Harveii Instituto in Aedibus Collegii Regalis Medicorum Londinensis Habita die Junii XXVI MDCCCLXIII.
1865. Acland, Sir H. W. Harveian Oration, 1865.
1866. Paget, G. E. Harveian Oration, 1866.
1867. Alderson, J.
1869. Rees, G. O. Harveian Oration. Delivered at the Royal College of Physicians, June 26, 1869.
1870. Gull, Sir W. W. Harveian Oration. Delivered at the Royal College of Physicians, London, June 24, 1870.
1871. Chambers, T. K. Restorative Medicine.***
1872. Farre, A. Harveian Oration. Delivered at the Royal College of Physicians, June 26, 1872.
1873. Rolleston, G. The Harveian Oration, 1873.
1874. West, G. Harvey and His Times.***
1875. Guy, W. A. Harveian Oration, 1875.
1876. Parkes, E. A. Harveian Oration, 1876.
1877. Sieveking, E. H. Harveian Oration.***
1878. Sanderson, J. B.
1879. Wilks, S. Harveian Oration. Delivered at the Royal College of Physicians, June 26, 1879.
1880. Ogle, J. W. Harveian Oration, 1880.***
1881. Barclay, A. W. Harveian Oration.***
1882. Johnson, G. Harveian Oration.***
1883. Habershon, S. O. Advancement of Science by Experimental Research.****
1884. Reynolds, J. R. Harveian Oration.***
1885. Quain, R. Healing Art in its Historic and Prophetic Aspects.*** (2 copies.)
1886. Pavy, F. W. Harveian Oration.***
1887. Stone, W. H.
1888. Latham, P. W. Harveian Oration.***
1889. Pollock, J. E.
1890. Andrew, J. Harveian Oration.***
1891. Dickinson, W. H. Harveian Oration on Harvey in Ancient and Modern Medicine.
1892. Bridges, J. H. Harvey and his Successors.***
1893. Pye-Smith, P. H. ***Harveian Oration for 1893.
1894. Brunton, Sir. T. L. Modern Developments of Harvey's Work.
1895. Church, W. S. Harvey and the Rise of Physiology in England.

1896. Payne, J. F. Harvey and Galen.
1897. Roberts, Sir W. Science and Modern Civilization.
1898. Duckworth, Sir D. Influence of Character and Right Judgment of Medicine.
1899. Poore, G. V. Harveian Oration.
1900. Allbutt, Sir T. C. Science and Medieval Thought.
1901. Moore, N. Harveian Oration.
1902. Ferrier, Sir D. Heart and Nervous System.
1903. Allchin, W. N. Structure and Function.
1904. Caton, R. I. I-em-hotep and Ancient Egyptian medicine.***
1905. Roberts, F. T. The Harveian Oration.
1906. Osler, W. The Growth of Truth as Illustrated in the Discovery of the Circulation of the Blood.
1907. Taylor, F. Need of Research in Medicine.***
1908. Ormerod, J. A. Heredity in Relation to Disease.
1909. Savage, G. H. Experimental Psychology and Hypnotism.
1910. Donkin, Sir. H. B. Inheritance of Mental Characters.
1911. Williams, T. C. Old and New Views on the Treatment of Consumption.
1912. Goodhart, Sir. J. The Passing of Morbid Anatomy.
1913. Bruce, J. M. The Influence of Harvey's Work in the Development of the Doctrine of Infection and Immunity.
1914. Powell, Sir R. D. The Harveian Oration on Advances in Knowledge Regarding the Circulation and Attributes of the Blood Since Harvey's Time.
1915. Coupland, S. The Harveian Oration.
1916. Barlow, Sir T. Harvey, The Man and the Physician.
1917. Saundby, R. Harvey's Work Considered in Relation to Scientific Knowledge and University Education in His Time.
1918. Kidd, P. The Doctrine of Consumption in Harvey's Time and Today.
1919. Crawford, R. The Harveian Oration on Forerunners of Harvey in Antiquity. *Brit. Med. J.*, 1919, II, 551.
1920. Andrews, Sir T. W. Birth and Growth of Science in Medicine.
1921. Spencer, H. R.
1922. Chaplin, A. Medicine in the Century before Harvey.
1923. Starling, E. H.
1924. Garrod, Sir A. E.
1925. Mott, Sir F. On some Developments of Harvey's doctrine: "Omne vivum ex ovo."
1926. Bradford, Sir J. R. The Debt of Medicine to the Experimental Method of Harvey.
1927. Hale-White, Sir W. The Harveian Oration on Gilbert, Bacon, and Harvey. *Brit. Med. J.* 1927, II, 713.

Of the orations of the past seventy years, most can be found in the *British Medical Journal* or *Lancet*.

2. COMMENTATORS*

(1) Aveling, J. H. Memorials of Harvey; including/a letter and autographs in/ facsimile. London, J. and A. Churchill, 1875.
(2) Baas, Dr. Joh. Hermann. William Harvey, Der/Entdecker des Blutkreislaufs/*** Stuttgart/Verlag von Ferdinand Enke/1878.
(3) Barzellotti, Giacomo. Dialogo/Sulla Scoperta/Della/Circolazione Del Sangue/Nel/Corpo Umano/Pisa/Presso Ranieri Prosperi/1831.
(4) Bell, Sir Charles, F.R.S.E. An Essay/on/The Forces/Which Circulate the Blood;/*** London: 1819.
(5) Brambilla, Gio–Alessandro. Storia delle scoperte fisico-medico anatomico chirurgiche.*** Milano, Maggiore, 1780–82.

"What he [Columbus] wrote about the blood vessels was done with exactness and clearness. He begins with those of the liver and most beautifully explains the action of the heart. The action of systole and diastole, of the auricles, of the valves and their vessels in explaining the circulation of the blood and especially in the lungs, are well thought out and expressed. Although others may have written before him about the actions of this important organ, nobody before him or among his contemporaries wrote or reasoned with equal clearness" (p. 107). He quotes Columbus' sentences but does not support the views that "Columbus made the great discovery of the circulation of the blood many years before Cesalpinus and Harvey." Brambilla believes (p. 108) that it was made "little by little" by Columbus, Cesalpinus and Harvey.

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* Arranged alphabetically.

(6) Ceradini, G. Qualche Appunto Storico-Critico/Intorno Alla/Scoperta Della Circolazione del Sangue/Genova/1875.

Ceradini believes that the discovery of the circulation is "una scoperta che appartiene incontestabilmente a nostro Cesalpino."

(7) Ceradini, G. Difesa Della Mia Memoria/Intorno Alla/Scoperta Della Circolazione Del Sangue/Contro L'Assalto Dei Signori/H. Tollin e W. Preyer/Genova; 1876.

Self explanatory.

(8) Ceradini, Dott. G. La Scoperta; Della/Circolazione del Sangue; Nuova Edizione rifatta ed aumentata; Milano; Fratelli Rechiede Editori/1876.

(9) Chapman, Henry C. M.D. History of the Discovery/of the/Circulation of the Blood./Philadelphia, P. Blakiston, Son & Co., 1884. Pp. 56.

(10) Chéreau, M. Achille. Histoire 'un Livre. Michel Servet et la Circulation Pulmonaire. Paris, G. Masson, Editeur, 1879.

(11) DaCosta, J. M. Harvey and His Discovery. Philadelphia, J. B. Lippincott and Co., 1879.

(12) Coxe, John Redman. An Inquiry into the Claims of Doctor William Harvey to the Discovery of the Circulation of the Blood; with a More Equitable Retrospect of that event. Philadelphia, C. Sherman and Co., 1834.

An early American essay against Harvey as the only discoverer of the circulation.

(13) Curtis, John Green. Harvey's Views on the Use of the Circulation of the Blood. New York, Columbia University Press, 1915.

An able American exposition of Harvey's "true position in the world of physiological thought," tending to show him "to be a disciple more of Aristotle than of Galen."

(14) Dalton, J. C. Doctrines of the Circulation. Philadelphia, Henry C. Lea's Son and Co., 1884.

Another valuable American contribution. This copy contains an autographed letter from the author to Weir Mitchell.

(15) De Lint, J. G. Atlas Van De Geschiedenis Der Geneeskunde. Amsterdam, S. L. Van Looy—Menno Hertzberger, 1925.

With numerous portraits and title-pages of persons connected with the discovery of the circulation: Riolan, Caspar Hofman, Descartes, Beverwyck, de Back, de Roy, Deusing, Servetus. Title-page of Beverwyck who in 1637 wrote Harvey, supporting his views. Title-page of de Back, a supporter, etc.

(16) Ercolani, G. B. Carlo Ruini. Curiosita Storiche E Bibliografiche. Intorno Alla Scoperta Della Circolazione Del Sangue. Bologna, Zanichelli, 1873.

(17) Fisher, C. P. Bibliography of William Harvey, 1912. [In: S. W. Mitchell's, Some Recently Discovered Letters, etc.]

"Mr. Fischer's list of Harvey's works, published in 1912, has been the only

important source of bibliographical information hitherto available" (Keynes).

(18) Flourens, P. Histoire De La Découverte De La Circulation Du Sang. Deuxieme Edition. Paris, Garnier Freres, Libraires, 1857.

A very useful and readable account of the matter. Flourens is perhaps inclined to give Columbus more than his proper share of credit: "J'ai cru voir partout impreint dans la description animée de Colombo le cachet de l'originalité et de l'invention" (p. 248); while the majority consider that most of his ideas were borrowed.

(19) Flourens, P. A History of the Discovery of the Circulation of the Blood. Translated from the French by J. C. Reeve. Cincinnati, Rickey, Mallory and Co., 1859.

"When Harvey appeared all had been suspected but nothing established."

(20) Foster, Sir M. Harvey and the Circulation of the Blood, pp. 25–54. In: Lectures on the History of Physiology during the Sixteenth, Seventeenth and Eighteenth Centuries. Cambridge University Press, 1901.

An interesting chapter in physiological history with liberal quotations from Harvey's predecessors.

(21) Garrison, F. H. History of Medicine Ed. 3 Philadelphia, W. B. Saunders, 1921, pp. 242–246.

(22) Haller, Alb. De. Deux Memoires Sur Le Mouvement du Sang, **** A Lausanne, 1756.

Haller repeated many of Harvey's experiments and based his views largely on those of Harvey.

(23) Haller, Dr. Alb. A Dissertation on the Motion of the Blood ****. Translated by a Physician. London, Printed for J. Whiston and B. White, in Fleet-street, 1757.

(24) Harris, D. Fraser. Harvey v. Caesalpinus; The Controversy Reopened. *Edinburgh Med. J.*, 1911, VII, 140.

(25) Hemmeter, J. C. The History of the Circulation of the Blood. In: Master Minds in Medicine. New York, Medical Life Press, 1927.

(26) Hopstock, H. [See Lionardo da Vinci under B. Predecessors].

(27) Johnson, George. A defence of Harvey as the Discoverer of the Circulation of the Blood. In Reply to Prof. Scalzi, of Rome. London, Smith, Elder and Co., 1884.

Replying to Scalzi's defense of Cesalpinus against the author's defense of Harvey in his Harveian oration, q.v.

(28) Keynes, Geoffrey, F.R.C.S. A Bibliography of the Writings of William Harvey, M.D., Discoverer of the Circulation of the Blood. Cambridge University Press, 1928.

The latest source of information about Harvey and especially about Harvey collections.

(29) Luciani, Luigi. The Circulation of the Blood; Its Discovery. In: Human Physiology, translated by by Frances A. Welby, London, MacMillan and Co., 1911, I, Chap. VI.

Presenting the Italian point of view (23 p.), and carrying some of its developments into modern times.

(30) Mitchell, S. Weir. Some Memoranda in Regard to William Harvey, M.D. New York, 1907.

(31) Mitchell, S. W. Some recently discovered letters of William Harvey with other Miscellanea. College of Physicians of Philadelphia, 1912.

(32) Moore, Norman. Harvey's notes on Galen. Appendix v in: The History of the Study of Medicine in the British Isles.

See also, on page 2: "Dr. Baldwin Hamey wrote in Latin a biographical history of the physicians of his time from the year 1628, entitled: 'Bustorum Aliquot Reliquiae.' He endeavors to give the character of each physician in a few sentences, and though he never sacrifices truth to brevity he is not always free from the conceits which were in fashion when he was young. His account of Harvey is an example:

"'Of William Harvey, the most fortunate anatomist, the blood ceased to move on the third day of the Ides of June in the year 1657, the continuous movement of which in all men, moreover, he had most truly asserted. What more: His statue in his robes, and the marble carved with his epitaph in his museum in our college as well as his annual celebration will easily atone to Harvey for this my brevity. Unless, perhaps, it may be pleasing to add an epigram I made: That according to the opinion of Copernicus as to the motion of the earth and of Harvey as to the movement we are here: 'Tunc agit atque agimus nos rota nosque rotam' or in English: Then are we all in a wheel and a wheel in us all.'"

(33) de Murr, Christophorus Theophilus. Adnotationes ad bibliothecas Hallerianas botanicam, anatomicam chirurgicam et medicinae practicae cum variis ad scripta Michaelis Serveti pertinentibus. Erlangae, Apud Io. Ias. Palm., 1805.

See page 60 for notes on Servetus.

(34) Osler, William. Michael Servetus· *Johns Hopkins Hosp. Bull.*, 1910, XXI, I.

The best account of Servetus in English by Osler in his happiest vein.

(35) (Osler, William). A New Commentary on Harvey. Editorial in the *Lancet*, 1916, I, 417.

(36) Paget, George E. Notice of An Unpublished Manuscript of Harvey. London, Longman, Brown, Green and Longmans, 1850.

Description of a MS. in the British Museum, on which is written in Sir H. Sloane's hand, "Gulielmus Harvenius musculis, motu locali," with proof that it was actually in Harvey's handwriting.

(37) Pariser, Bernardus, Nathan/Historia opinonum quae de sanguinis circulatione ante Harvaeum viguerint. Berolini, Brüschkianis (1830).

(38) Pettigrew, Thomas Joseph. William Harvey, M.D. In: Biographical Memoirs of the Most Celebrated Physicians, Surgeons, etc. etc. London, 1838–1839.

(39) Pozzetti, Da Pompilio. Elogio Di Lazaro Spallanzani. Parma, Per Li Fratelli Gozzi, 1800.

With curious full length portrait.

(40) Richet, Charles, Harvey [William] In: Dictionnaire de Physiologie, VII, Paris, Alcan, 1909.

(41) (Royal Society of Medicine, Section on the History of Medicine). Portraits of Dr. William Harvey. Oxford University Press, 1913.

Nineteen portrains with a picture of Harvey's coffin and a list of "engraved portraits, busts and statues."

(42) Scalzi, Francesco. Andrea Cesalpino. Scopriotore Della Circolazione Del Sangue. Roma, Tipografia Romana, 1876.

(43) Seelig, M. G. Medicine. An Historical Outline. Baltimore, Williams and Wilkins Company, 1925.

(44) Sprengel, Kurt. Beiträge zur Geschichte der Medicine. Halle, 1794.

One of the first to confuse the issue between Harvey and Cesalpinus, who in the words of Willis "has done much to mislead opinion in regard to the Discoverer of the Circulation." "One may find in Harvey's education the causes which permitted him to make his great discovery."

(45) Stirling, William. William Harvey. In: Some Apostles of Physiology."

London, printed privately by Waterlow, 1902.

Also contains articles on Vesalius, Servetus, Fabricius, Aselli, Malpighi, etc.

(46) Thomson, Sir St. Clair. Shakespeare and Medicine. *Trans. Med. Soc. Lond.*, 1916, XXXIX, 257.

Various quotations from Shakespeare pertaining to the circulation of the blood.

(47) Tollin, Henri. Matteo Realdo Colombo. Ein Beitrag zu seinem Leben aus seinen Buch de re anatomica. Bonn, 1880.

(48) Tollin, Henri. Matteo Realdo Colombo's Sektionen und Vivisektionen. Bonn, 1880.

(49) Tollin, Henri. Die Entdeckung des Blutkreislaufs durch Michael Servet (1511–1553). Jena, Verlag von Hermann Dufft, 1876.

Tollin suggests that Harvey and Columbus probably saw Servetus' work, of which doubtless more copies existed at that time. This has been ably controverted by Ceradini.

(50) Tollin, Henri. Andreas Caesalpin. Bonn, Pfluger's *Arch. f.d. ges. Physiol.*, Bd. XXXV, 1884.

(51) Tommasini, Giacomo. Quanto Influisca Il Cuore Su La Circolazione Del Sangue. Parmense, Dalla Reale Tipografia, 1794.

(52) V. den Linden, Joh. Hippocrates. De Circulatione Sanguinis Exercitationes XXVII. Lug. Bat., 1659–1663.

This reference is included because of the author's assertion "There cannot be the shadow of a doubt that the circulation of the blood was known to Hippocrates"—! See R. Willis, p. 22.

(53) V. Leersum, E. C. Opuscula Sellecta Neerlandicorum de Arte Medica. *Janus*, 1927, II, 474.

Numerous references to the part played by Dutch scientists in support of Harvey's views both by writing and by experiment as found in the publications of "Opuscula Selecta Neerlandicorum."

(54) Willis, R. William Harvey. A History of The Discovery of the Circulation of the Blood. London, C. Kegan Paul & Co., 1878.

The most satisfactory and informative of modern commentators, though somewhat tinged with the nationalism that he deplores in others.

(55) Willis, Robert. Servetus and Calvin. A Study of an Important Epoch in the Early History of The Reformation. London, Henry S. King and Co., 1877.

Note: A further bibliography of this subject can be found in the Index Catalogue of the Surgeon General's Library, first, second and third series, under the headings "Blood, Circulation of, history of, discovery of," also "Harvey," "Servetus," etc.

II. PAINTINGS, ENGRAVINGS, PHOTOGRAPHS, ETC.

1. Oil-painting from the original by Janssen in the Royal College of Physicians, London. (Copied by Anna Lea Merritt.) Bequeathed by S. Weir Mitchell, 1914.
2. Engraving. J. Houbraken after Bemmel, sculp. J. Knapton, imp. London. 1739. (Framed.)
3. Engraving of bust.
4. Engraving of bust. (Framed.)
5. Engraving of Harvey demonstrating to Charles I, his theory of the circulation of the blood. (Framed.)
6. Photographs of the church at Hempstead, in Essex, England where Harvey lies buried, with views of the bust of Harvey and of the vault as it was seen when opened by Dr. Richardson. (Framed.)
7. Photograph of the Harvey tercentenary memorial statue by Albert Bruce Joy. (Framed.)
8. Photograph of the Harvey statue

at his birthplace, Folkestone. (Framed.)

9. Photograph taken from the family portraits in Rolls Park. (Framed.)
10. Photograph of William Harvey, his wife and children.
11. Portrait in oil; artist unknown. Presented by Mrs. H. C. Jenks. (Said to be by or after Rubens.)
12. Engraving by E. Scrivens, from the original picture by C. Janssen, in the possession of the Royal Society. (Published under the superintendence of the Society for the Diffusion of Useful Knowledge.)
13. Engraving by J. Thomson, after C. Janssen. Published by McQueen.
14. Lithograph, published by W. H. Fanning, after the painting by C. Janssen.
15. Engraving, Audinet, sculp. Bemmel, pinx. Published by Harrison & Co., April 1, 1792.
16. Large photolithograph after the painting by an unknown artist in the National Portrait Gallery.
17. Engraving, Bemmel, pinx't. T. Cook. sculp.

III. MISCELLANEOUS ITEMS.

1. Harvey's teacup and saucer, with coat of arms and floral decorations, in color. "From the Harvey Mansion, Essex, England. Presented by S. Weir Mitchell."
2. Photograph of rubbing from the plate on Harvey's lead sarcophagus.
3. Harvey's stemma in the aula of the University of Padua. (Hand painted in color.)
4. Photograph. "The remains of William Harvey, discoverer of the circulation of the blood, were respectfully placed in this sarcophagus, by the Royal College of Physicians of London, in the year 1883."
5. Medals and badges. International Physiological Congress, Edinburgh, 1928. Gilded medallion of William Harvey, 1578–1657.

MARTIN LISTER, ZOOLOGIST AND PHYSICIAN

By S. WOOD

LONDON

A BRANCH of the important family of Lister settled in Buckinghamshire, and to this branch belonged the subject of the present memoir. He was born at Radclive, near Buckingham, in 1638, his parents being Sir Martin Lister and Susannah, the daughter of Sir Alexander Temple; this lady became maid of honor to Anne of Denmark, queen of James I, and was esteemed the greatest beauty of the Court. As a boy Lister received his education from Sir Mathew Lister, physician to Charles I, and on the 12th of June, 1655, entered as a pensioner at St. John's College, Cambridge, where he graduated B.A. in 1658, and M.A. in 1662; at the Restoration he was by royal mandate made a Fellow of his College. Having graduated he travelled and on returning was created, in 1683, M.D. at Oxford, the Chancellor himself recommending him as a person of exemplary loyalty, of high esteem among the most eminent of his profession, of singular merit to that university in particular (having enriched their museum and library[1] with presents of valuable books, both printed and in manuscript), and of general merit in the literary world by several learned books which he had published. At the Royal College of Physicians he became a candidate in 1684, a Fellow in 1687, and a Censor in 1694. He was elected a Fellow of the Royal Society on the recommendation of Edward Lhuyd in 1671, and settled at York where he practiced medicine with considerable repute until 1683.

Lister was a great naturalist as well as an eminent physician; he collected over one thousand specimens of shells, which he presented to the Ashmolean Museum at Oxford, and was the first to construct maps of geological strata. His works were very numerous; upwards of sixty papers from his pen on meteorology, minerals, molluscs, medicine and antiquities appear in the *Philosophical Transactions* of the Royal Society. His published monographs include: "A History of English Animals" (1678), an Appendix to the same (1681); "Letters and Mixt Discourses on Natural Philosophy" (1683); "The Baths and Medical Fountains of England" (1684); another work on the same subject (1686); several works on shells, and a record of the journey to Paris in 1698. An extended list of his publications appears in the "Dictionary of National Biography.[2] His name lives in the specific term given to a fossil well known to all Jurassic geologists, namely *Cardenia Listeri*, which is the admitted type of a genus of Mollusca; it is also connected with a shell of the genus Mactra, viz., *Mactra Listeri*. In the British flora the genus *Listera*, formerly included in the *Ophrys*, was named in his honor.

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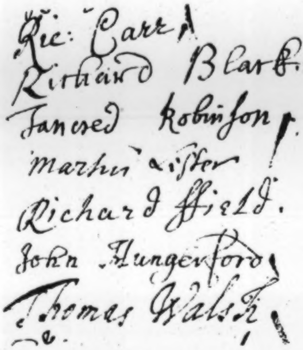
[1] Forming part of a collection of Lister MSS. in the Bodleian Library at Oxford are three volumes of letters, covering the period 1665–1710, addressed to Lister from various writers, the most interesting being Pepys, Flamsteed, Grew, Halley, Hooke, Lhuyd, Sarah Duchess of Marlborough, who was a relative of Lister; Henry Mordaunt Earl of Peterborough, Plot, and Sloane. Here also is the Order for Lister to attend the post-mortem examination of Charles II's body, February 7, 1685. Additional MSS. may be seen at the British Museum, a list of them being in Scott's Catalogue of the Sloane MSS., p. 312.

[2] Vol. 33, Lond., 1893.



Ric: Carr
Richard Blackmore.
Tancred Robinson
Martin Lister
Richard ffield.
John Hungerford
Thomas Walsh

Fig. 1. Lister's Signature in the Fellows' Book of the Royal College of Physicians, London.

On returning in 1670 from his first journey to the Continent he went to practice among his friends in Yorkshire, and while there studied the history and natural history of the county. On account of his skill, however, he was advised to remove to London; this he did about the year 1683 and took up his residence in Old Palace Yard, Westminster. Two years later he was elected Vice-President of the Royal Society. For the benefit of his health he accompanied the Earl of Portland on an Embassy to the French Court in 1698; he remained in Paris six months and on returning published an account of the journey which ran through three editions within the year. This book was travestied by Dr. William King in the "Journey to London" but its minuteness gives it historical value. It was included in Pinkerton's "Voyages"; reprinted with annotations by G. Henning, M.D. in 1823, and translated into French, being published at Paris in 1873. He continued in favor at Court but received no staff appointment until the retirement of Sir Edward Hannes in 1709, when he and Dr. Arbuthnot were appointed physicians in ordinary to Queen Anne, Dr. Arbuthnot having precedence; subsequently, however, he became Primarius Medicus.

About 1670 he married Anne, daughter and heiress of Thomas Parkinson, of Carleton, in Craven, county York, by whom he had three sons and five daughters.[3] Two of these ladies, Susannah and Mary, being skilful in the use of the pencil, illustrated their father's great work "Historia Conchyliorum"[4] published in 1685. His second wife was Jane Cullen, of St. Mildred, Poultry, whom he married at St. Stephen's, Walbrook, Oct. 24, 1698.

Lister died at Epsom, aged seventy-four, but he probably had a suburban house at Clapham where, in St. Paul's Church, of which he was a Benefactor, he was buried on February 2, 1712. In his will occurs the clause: "My body shall without pomp and in a private manner be carried in a hearse, attended only by one mourning coach to Clapham and there be buried in the grave of my late deceased wife Hannah." A memorial stone[5] was erected bearing the following inscription:

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[3] One of the children was buried in Westminster Abbey where a marble tablet to her memory may be seen. The inscription is well known and reads: "Jane Lister, dear childe, died Oct. 7, 1688." Dean Stanley made allusion to the sorrow expressed in this brief epitaph "which goes to the heart of everyone. In the eventful year of the Revolution, when Church and State were reeling to their foundations, this 'dear child' found her quiet resting-place in the Eastern Cloister."

[4] "This work is the basis and ancient foundation of all good conchology. It is impossible to contemplate this stupendous effort of genius and industry without admiration at the grandeur of the design and the correctness of its execution." (Turton, "Conchological Authors.") The book originally appeared in five parts during the years 1685–9; Ed. 2, 1699, New Ed. 1770, again 1823.

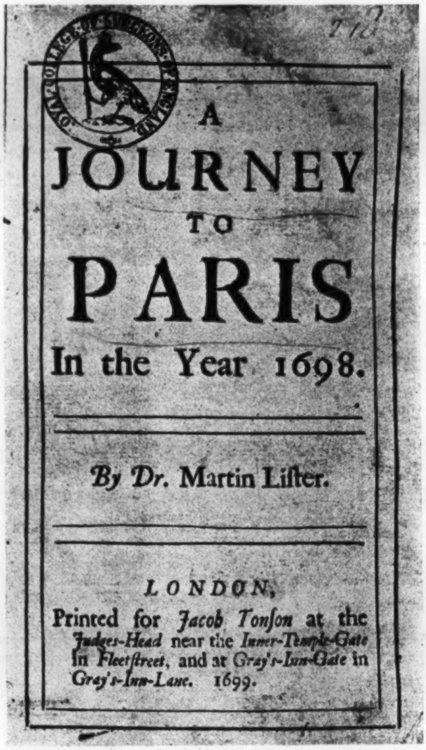
Near this place is buried the body of
MARTIN LISTER
Doctor of Physick a Member of the
Royal Society and one
of Queen Ann's Physitians
who departed this life the second day
of February, 1711–12.

NOTE: I wish to acknowledge the kindness of Mr. E. T. Leeds, Keeper of the Ashmolean Museum, Oxford; Dr. Chaplin, Harveian Librarian of the Royal College of Physicians; Mr. W. J. Bishop, Assistant Librarian of the College; and the Rev. Sir Henry Lyster Denny, Bt., Rector of West Wickham, Kent, the author of a monumental work on the Lister family.

EXTRACTS OF MEDICAL INTEREST FROM MARTIN LISTER'S "JOURNEY TO PARIS IN 1698"

Reader, I promise not to trouble you with Ceremonies either of State or Church, or Politicks; for I entred willingly into neither of them. I incline rather to Nature than Dominion; and took more pleasure to see Monsieur Breman in his white Wastcoat digging in the Royal Physick Garden, and sowing his Couches, than Monsieur Saintot making room for an Ambassador; and I found my self better disposed, and more apt to learn the names and physiognomy of a Hundred Plants, than of 5 or 6 Princes.

Another Reason, that I give you little or no trouble in telling you Court Matters, is, that I was no more concerned in the Embassy, than in the sailing of the Ship which carried me over: 'Tis enough for me, with the rest of the People of England, to feel the good Effects of it, and to pass away this Life in Peace and Quietness. 'Tis a happy turn for us, when Kings are made Friends again. This was the end of this Embassy, and I hope it will last our days. My Lord Ambassador was infinitely caressed by the King, his Ministers, and all the Princes . . . : but to the Business.



A
JOURNEY
TO
PARIS
In the Year 1698.

By Dr. Martin Liſter.

LONDON,
Printed for *Jacob Tonſon* at the
Judges-Head near the *Inner-Temple-Gate*
in *Fleetſtreet*, and at *Gray's-Inn-Gate* in
Gray's-Inn-Lane. 1699.

FIG. 2. FACSIMILE TITLE-PAGE OF THE COPY IN THE LIBRARY OF THE ROYAL COLLEGE OF SURGEONS, LONDON. (BY KIND PERMISSION OF MR. V. G. PLARR, LIBRARIAN.)

I happily arrived at Paris after a tedious

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[5] I was fortunate in meeting a fellow-student of Lister in the Rev. T. C. Dale, Curate of St. Paul's, to whom I am grateful for information and for showing me the tablets on the north wall of the church. That of Lister is now so weather-worn as to be illegible; the inscription on the second stone reads: "Hannah Lister, Deare Wife, died Aug. 1695, left six children in tears for a most indulgent mother." St. Paul's occupies ground which has been the site of a church for 800 years; it is situated in Rectory Grove and a pathway with the curious name "Matrimony Place" goes through the churchyard.

Journey in very bad Weather; for we set out of London the 10th of December, and I did not reach Paris till the first of January; for I fell sick upon the Road, and stay'd 5 days at Bologne, till my Fever abated; yet notwithstanding so rude a Journey, I recovered, and was perfectly cured of my Cough in 10 days, and never had the least return of it all the Winter, though it was as fierce there as I ever felt it in England. This great benefit of the French Air I had experienced 3 several times before, and had therefore long'd for a passage many years; but the continuance of the War was an insuperable Obstacle to my Desires.

For the quantity of Ground possessed by the Common People, this City is much more populous than any part of London; here are from 4 to 5 and to 10 Menages, or distinct Families in many Houses; but this is only to be understood of certain places of Trade. This difference betwixt the two Cities also is true, that here the Palaces and Convents have eat up the Peoples Dwellings, and crouded them excessively together, and possessed themselves of far the greatest part of the Ground; whereas in London the contrary may be observed, that the People have destroyed the Palaces, and placed themselves upon the Foundations of them, and forced the Nobility to live in Squares or Streets in a sort of Community; but this they have done very honestly, having fairly purchased them.

Here are daily to be seen in the Streets great variety of Monks, in strange unusual Habits to us Englishmen. I cannot but pity the mistaken Zeal of these poor Men; that put themselves into Religion, as they call it, and renounce the World, and give themselves most severe Rules of Living. Their Meager Diet is much against Nature. 'Tis enough, if we chance to suffer Persecution, to endure it with Patience, and all the miserable Circumstances that attend it; but wantonly to persecute ourselves, is to do violence to Christianity. To choose the worst of food, sowre Herbs and Fish, and such like Trash, and to lie in course and nasty Woollen Frocks upon Boards; To go Barefoot in a cold Country, to forego the Comforts of this Life, and the Conversation of Men; This is to hazard the Health and in a manner to destroy ourselves. These men, I say, must be out of humour with the World and become weary of such slavish and fruitless Devotion.

Beggars abound and these, I say, are true Monks, if you will, of God Almighties making, offering you their Prayers for a Farthing, that find the evil of the day sufficient for the day, and that the Miseries of this Life are not to be courted, or made a mock of; These Worship much against their will all rich Men, and make Saints of the rest of Mankind for a Morsel of Bread.

Good and wholesome Food, and plenty of it, gives Men naturally great Courage. Again, a Nation will sooner be Peopled by the free Marriage of all sorts of People, than by the additional stealth of a few starved Monks, supposing them at any time to break their Vow. This limiting of Marriage to a certain People only lessens also the number of God's Worshippers, instead of multiplying them as the Sand upon the Sea Shoar; These men wilfully cut off their Posterity, and reduce Gods Congregation for the future.

The Streets are lighted by candles, 20 paces apart. The King is said to have raised a large tax by granting the people the priviledge of hanging out Lanthorns in this manner. In the Preface to the Tax it is said, That considering the great danger his Subjects were in, in Walking the Streets in the Dark, from Thieves, and the breaking their Necks by falls, he for such a Sum of Money did grant this Priviledge. If any man break the lanthorns he is sent forthwith to the Gallies.

The statue of the Grand Monarque in the Place-Victoire is that of a vast Winged Woman close behind his Back, holding forth a Laurel Crown over the King's Head. What I like not in this is the great Woman perpetually at the King's Back, which is a sort of Embarras, and instead of giving Victory; seems to tire him with her Company. This Woman is enough to give a Man a surfeit.

The Palais Mazarin has a great Collection of Ancient Greek and Roman Statues: but such as were made Nudae, are miserably disguised by the fond Humour of the Duke de Mazarin, who in a hot Fit of Devotion caused them to be castrated and mangled, and then frocked them by a Sad Hand with I know not what Plaister of Paris, which makes them very ridiculous. The Toga, as represented in these ancient statues, was made of very fine Wooll, or Flannel, and the wearing of this substance in a hot country led to frequent bathing; much Bathing brought in Oils, and Oils Perfumes infused in them. The use of oils prevented the warm Water from making the skin intolerable tender and wrinkled. The naked Indians and Blacks secure their skins by oils from all the injuries of the weather, both from heat and cold. But a fair Linnen Shirt every day is equal in cleanliness to the daily bathing of the Romans, and the best Rule of Health and Long Life is to do little to ourselves. People make pleasant that which is very destructive to their Healths; as is the Case of Cloathing, Tobacco, Strong Waters, Steel Remedies, the Drinking Mineral Waters, Bathing, Tea, Coffee, Chocolate, etc.

On seeing the statue of a Sybil:

The face of the old woman was cut very deep into the stone, within the Quoifure, like a Hood pulled over the Forehead, a very Emblem of an Oracle. What was the fancy of the Men of the first Ages to make old women prophetesses. To make them Sagae and Veneficae is reasonable enough; for old age makes all people spiteful, but more the weaker sex; To poison and bewitch are the secret revenges of impotent people. The Jews were impatient of the Company of Woman in their religious rites, lest they should contaminate and spoil all their devotion. The Romans thought religion became women better than men. Tully bids his wife supplicate the Gods for him for he tells her, he thought they would be kinder to her than him. Upon some such Principle, probably, their Prophetesses were in esteem.

At the Louvre I was shown by M. Gerardin many ancient Statues and Vasa, and a 100 other things relating to Antiquity. Here also I saw the Mummy of a Woman intire, and a small image found inclosed in a Mummy. This represented a lean Man, Cast bent, in a sitting Posture, with a roll of Parchment spread open upon his Knees, and he looking down upon it, Reading it. He seemed to have a thin Linnen Garment on, perhaps such as the Aegyptian Priests used to wear. The figure was of Solid Brass, the Head and all. I later saw another of these images, in the Collection of Monsieur Boudelot, which represented the Skeleton of a Woman of solid Copper; this also was in a sitting Posture.

In M. Boudelot's Cabinet there is a marble of a Cupid asleep and in his hand he holds two Poppy heads. 'Tis probable the Poppies were emblimatique from the power they have in love affairs. Indeed most poisons affect those parts chiefly, being the great Sluce of the Habit of the body or circle of the Blood, and no people use Poppy more, and stand more in need of it than the men who delight in Polygamy, the Mahometans, or understand it better; as Olearius testifies.

M. Boudelot shewed me also a Stone taken lately out of the Body of a Horse at Paris, which was his Death; and dying strangely, they Dissected him, that is, certain Ignorant People; in the lower part of the Body, (probably the Bladder) was found this Stone: It weighs, as I guess, two Pound; it is as round as a Cannon Ball; it is laminated like an Onion; for the first Couche was broken up in some Places, of a dark Hair colour, and transparent; or like some Cloudy Agats which I have seen: It was very ponderous. Such like Transparent Stones I had a Patient voided often in Yorkshire. I saw another Transparent one, which was cut out of the Buttock of an Alderman at Doncaster; he was twice cut in the same place, at some years distance. Another I had in some measure transparent, voided by a Patient, which was of the very colour of a Coffee-Berry whan burnt; but of this Stone Monsieur Boudelot writ me a Letter before I left Paris, which I design to publish.

St. Innocents Church-Yard, the publick Burying-place of the City of Paris for a 1000 years, when intire (as I once saw it) and built round with double Galleries full of Skulls and Bones, was an awful and venerable sight; but now I found it in Ruines, and the greatest of the Galleries pulled down, and a Row of Houses built in their room, and the Bones removed I know not whether; The rest of the Church-Yard in the most neglected and nastiest pickle I ever saw any Consecrated place. 'Tis all one, when Men, even the Roman Catholicks have a mind, or 'tis their interest, to unhallow things or places, they can do it with a good stomach; and leave the Tombs of Chancellors and other great Men without Company or Care. What no body gets by, no body is concerned to repair; but 'tis strange amongst so many millions of dead Men, not one Wonder-working Saint should start up to preserve it self and neighbours from Contempt and Scandal. That so much Holy Earth, brought, as 'tis said, so far off, should never produce one Saint, but rather spue up all its Inhabitants, to be thus shuffled and dissipated.

I was to see M. Verney at his Apartment at the Royal Physick Garden; but missing my Visit, went up, with a young Gentleman of my Lord Ambassador's Retinue, to see Mr. Bennis, who was in the Dissecting Room, working by himself upon a Dead Body, with his Breast and Belly gutted: There were very odd things to be seen in the Room. My Companion, it being morning, and his Senses very quick and vigorous, was strangely surprised and offended; and retired down the Stairs much faster than he came up: And indeed, a private Anatomy Room is to one not accustomed to this kind of Manufacture, very irksome, if not frightful: Here a Basket of Dissecting Instruments, as Knives, Saws, etc. And there a Form with a Thigh and Leg flayed, and the Muscles parted asunder: On another Form an Arm served after the same manner: Here a Trey full of Bits of Flesh, for the more minute Discovery of the Veins and Nerves; and every where such discouraging Objects. So, as if Reason, and the good of Mankind did not put Men upon this Study, it could not be endured: for Instinct and Nature most certainly abhors the Employment.

I saw Monsieur Merrie, a most painful and accurate Anatomist, and free and communicative Person, at his House Rue de la Princesse. His Cabinet consisted of two Chambers: In the outward were great variety of Skeletons; also entire Preparations of the Nerves; in two of which he showed me the mistake of Willis, and from thence gathered, that he was not much used to dissect with his own Hand: The Pia Mater coating the Spinal Nerves but half way down the Back, where it ends: The Dura Mater coating the lowermost 20 pair; which, Willis, (as he said) has otherwise reported.

But that which much delighted my Curiosity, was the Demonstration of a blown and dried Heart of a Foetus; also the Heart of a Tortoise. In the Heart of a Foetus, he shewed it quite open, and he would have it that there was no Valve to the Foramen Ovale; which seem'd equally open from the Left Ventricle to the Right, as the Contrary; that it's Diameter well near equalled that of the Aorta: That the two Arteries, which ascend up into the two Lobes of the Lungs, and are the Ramifications of the Pulmonick Artery and the lower or descending Branch of the Aorta) both put together, far exceed, if not double the Diameter of the Aorta itself.

He therefore, not without good Reason affirms, That of all the Blood which the Vena Cava pours into the Right Ventricle of the Heart, and is thence in a Foetus forced up into the Pulmonick Artery, a great part is carried by the Canal of Communication into the descending Trunk of the Aorta, and is so circulated about the Body, the Lungs (as to that part) being wholly slighted: Also that of the two remaining thirds of the Blood, which is carried about the Lungs, when it comes down the Pulmonick Vein, that which cannot be received by the Aorta, (and all cannot, because the Aorta is much less than the two Branches of the Pulmonick Artery put together) is therefore discharged back through the Foramen Ovale, into the Right Ventricle of the Heart, and so thrown up again with the rest of the Blood, coming from the Vena Cava. So that one part of the two remaining parts of the Blood is carried daily about the Body, as in an Adult Foetus, and a third part only Circulates in the Lungs, passing by the Body or Grand Circulation.

That all this is done to abbreviate and reduce the Circulation to a lesser compass, is certain; and so for the same Reason and End, that other lesser Circulation of the Liver is slighted by the Blood, which returns from the Placenta, by a Canal of Communication betwixt the Porta and the Vena Cava.

The Reason he gives of this, I cannot at all allow of; as being very ill grounded; and therefore I shall not trouble my self to Confute, or so much as Name it.

As for the Heart of the Land Tortoise, it was preserved in Spirit of Wine, and all the three Ventricles thereof slit and opened; so that I had not all the Satisfaction I could have wisht: but the Left Ventricle in this Animal had no Artery belonging to it, but did receive only the Blood, which descended from the Lungs, and convey it by the Foramen Ovale into the Right Ventricle: That the third or middle Ventricle was only an Appendix to the Right, and had the Pulmonick Artery issuing from it. So that the Blood in a Tortoise was in a manner Circulated like that in a Foetus, through the Body, the Lungs as it were or in good part slighted.

This Thought of Monsieur Merrie's has made a great Breach betwixt Monsieur Verney and himself; for which Reason I had not that freedom of Conversation as I could have wisht with both of them; but 'tis to be hoped there may come good from an honest Emulation.

Two English Gentlemen came to Visit me, Mr. Bennis and Mr. Probie: They were lodged near the Royal Garden, where Monsieur Verney dwells, and makes his Anatomies, who in Three Months time shewed all the Parts of the Body to them. He had for this purpose at least Twenty Human Bodies, from the Gallows, the Chatelet, (where those are exposed who are found Murthered in the Streets, which is a very common business at Paris) and from the Hospitals.

They told me, M. Verney pretended to shew them a Valve, which did hinder Blood from falling back into the Right Ventricle by the Foramen Ovale. This Valve they said he compared to the Papillae in the Kidneys, Musculous and Fleshy: That if Wind was blown into the Vena Pulmonalis, it did not pass through the Foramen Ovale, but stop there, by reason of the Valve. That he did believe, contrary to Mr. Merrie, that no Blood did circulate through the Lungs in an Embrio.

Again, in another Conversation with Monsieur Merrie, he shewed me the blown Hearts of an Embrio, and that of a Girl of 7 years old. I saw clearly, that the skin of the supposed Valve of the Foramen Ovale, was as it were suspended with two Ligaments: And that in the Girl's, the two sides of the Foramen Ovale were drawn one over the other, and so closed the hole; but were easily to be separated again by a Bristle thrust betwixt them.

Also it seemed to me, that this Membrane in an Embrio might cover the Foramen Ovale, like the Membrana Nictans in a Birds Eye, that is, be drawn over it, and so hinder the Ingress of the Blood from the Vena Cava, as oft as the Right Auricle beats: But the Dilating it self might give way to the descending Blood of the Vena Pulmonalis; and possibly, the Embrio living as it were the Life of an Insect, can by this artifice Command the Heart.

I remember in Discourse that day with him, he told me, That Monsieur Verney had an old Cat, and a young Kitling just Born, put into the Air-pump before the Academie Royalle des Sciences: That the Cat died after 16 Pumps, but the Kitling survived 500 Pumps; which favours in some measure the Command young Animals have of their Hearts.

At another Visit, M. Merrie obligingly procured for me, the Heart of a Human Embrio, with the Lungs intire. He tried before me the Experiment upon Blowing, and also Syringing Water into the Aorta, both which filled the Auricles and Ventricles and freely, came out at the Vena Cava only. Then he opened the Right Auricle and Ventricle, where the Foramen Ovale was open only at one corner, not the tenth part of its breadth; and a Membrane drawn over the rest, which Membrane was fastened to the sides quite round. Then he opened in the same manner the Left Ventricle and Auricle, and there it was evident, that that Membrane which closed the hole, had two narrow Straps or Muscles by which it was fastened to the opposite sides, after the manner of some of the Valves of the Heart.

I told him, that it must follow from this, that the Foramen Ovale was shut and opened more or less, at the pleasure of the Embrio, according to the Necessities of Nature, and the quantity of Blood that was to pass: That it was probable, that all Insects had a Command of their Hearts, (of which I have given large Instances elsewhere) by some such passage, which they could shut altogether, or in great part, as they had a Mind, in Winter, in Fear, or Fasting for want of Food: That the shutting up of the passage in Adult Animals was therefore done in an instant, by drawing the Curtain fully, which could never be again drawn back and opened, because of the great torrent of Blood, which now entered the Right Auricle, stopt it in that posture, which in time would altogether stiffen and lose its Motion of Relaxation. As a Hen, when she Sleeps, draws over the Membrana Nictans; and likewise when she Dies, the same Membrane covers all the Eye.

Mr. Bennis procured me the Heart of a Humane Foetus, which had but just breath'd; the which I examined with M. Litre of Castres in Languedoc, another very Understanding and Dextrous Anatomist, and who Teaches Scholars of all Nations the Practice of Anatomy. The Experiments here were repeated as formerly described; both Wind and Water passed the Foramen Ovale, both from the Vena Pulmonum, and from the Aorta. That which I observed in this Heart more particularly, was, That the Membrane or Valve on the Left Side of the Foramen Ovale was flat, and extended almost over the hole, without any Limbus round its edges, because it was nothing but the very substance of the Auricula Sinistra continued, or a Process thereof: But on the right side the Vena Cava being joined to the Auricle, it had a rising edge round that part of it, whence it proceeded; that is, that the two Faces had contrary openings, and being drawn as it were one over the other, they shut the whole; but not so firmly, but the hole might be more or less open all a Man's Life. For those two Oval Processes sticking close together in a blown and dried Heart, that is not to be much heeded, for I have seen them dry with the hole open; but it has been like as betwixt unglued Paper, or as the Urethers descend betwixt the Skins of the Bladder, or as the same happens to the Ductus Biliaris in its insertion into the Guts.

The same Person brought me the Heart of a Man 40 years old, in which the Foramen Ovale was as much wide open; as in a Foetus new born; and the Ligaments very conspicuous, which tack the sides of the Valve to the Auricle, and go over to the other side of the Border.

I Visited M. Dacier and his Lady, two very obliging Persons, and both of great Worth, and very Learned. I think our Profession is much beholden to him, for his late elegant Translation of Hippocrates into French, with Learned Notes upon him. I wish he may live to finish what he hath so happily begun. I read over the Two Volumes he had Printed with great delight.

He seems to favour the Opinion of those, who think, the Circulation of the Blood was known to him; in which he errs undoubtedly. 'Tis manifest his Anatomy was rude, dark, and of little extent; but 'tis also as manifest, that he knew very well the effect of the Circulation, As for Example, 2. de Diaeta. c.12. All the Body (says he) is purged by Respiration and Transpiration, and what Humour thickens, is subtilized and thrown out by the Skin, and is called Sweat.

Again, 3. de Diaeta. c. 5. speaking of a sort of foul and impure Bodies, he says, More is by Labour melted out of the Flesh, than the Circular Motion (of the Blood) hath purged off. There are a great number of Instances of this Nature. In Conversation I put this to him, which he avowed was all he thought.

He told me he had two more Volumes ready for the Press, and did intend not to give it over, till he had gone through all the Works of Hippocrates.

I visited M. Morin, one of the Academie des Sciences, a Man very curious in Minerals; The Gentlemen of this Society are but few in number, about 12 or 16 Members; all Pensioned by the King in some manner or other. They endeavoured in the War time to have Printed Monthly Transactions or Memoires after the manner of ours in London: but could not carry them on above two Volumes or Years, for without great Correspondence this can hardly be done. The Abbot Bignon is President, Nephew to M. Pontchartrain. I was informed by some of them, that they have this great advantage to incourage them in the pursuit of Natural Philosophy, that if any of the Members shall give in a Bill of Charges of any Experiments which he shall have made; or shall desire the Impression of any Book, and bring in the Charges of Graving required for such Book, the President allowing it and signing it, the Money is forthwith reimbursed by the King. As it was done in Dr. Turnfort's Elements de Bontanique, the Cuts of that Book cost the King 12000 Livres. Also, if M. Merrie, for Example, shall require live Tortoises for the making good the Experiments about the Heart, they shall be brought him, as many as he pleases, at the King's Charge."

The King's Library is now taken out of the Louvre and placed in a Private House, where they shewed us also the Apartment of M. Hugeins, which was very Noble, and well for Air, upon the Garden; but here he fell Melancholly, and Died of it in Holland. He shewed the first Tokens of it by playing with a Tame Sparrow, and neglecting his Mathematick Schemes. 'Tis certain, Life and Health of Body and Mind are not to be preserved but by the Relaxation, and unbending the Mind by Innocent Diversions. For Sleep is nothing else that I know off, but the giving up the Reins, and letting Nature to Act alone, and to put her in full possession of the Body. We have a convincing instance of this, in being a Bed awake: No Man can lie still 3 Minutes without turning; and if it come not presently upon us, we must turn again and again: and at length we become so intolerably weary, that our Bed is a very Wrack to us. Whereas, if we chance to fall a sleep, though we lie in one and the same posture 7 hours, we shall Wake fresh and without pain, as tho' the Body did not Weigh at all upon it self in Sleep. 'Tis certain, the Nerves and Muscles are in little or no Tension in Sleep; but when we are awake, are always stretch'd and compressed, whence weariness: which, if upon our Feet or Sitting, we are not sensible off, because we remove quick and with ease, and of course; but laid, we soon find our selves very uneasie, till we change the posture . . .

At the Abbaie de St. Germains I visited Pere Mabillon who shewed me certain Figures of some very ancient Monuments observed upon the Mountain of Framond near Salme which lies in La Vauge, betwixt Alsace and Lorraine. There were great Remains of an ancient City. Five of these Figures were of Mercury; a Caduceus in his Hand which was very differently represented in all the Figures of him; sometimes held up, othertimes the point resting at his Feet; sometimes the Snakes were twisted about a Stick; and again in others without one, or the Designer had taken no notice of it; sometimes the Tail of the Serpents spread and flying about, and again in others close twisted with many braids . . .

In the Museum of St. Genevieve was the Leg of a Mummie well preserv'd the Toes only bare, black and shining as Pitch. I told the Father, that this was still Flesh; and that Mummie therefore in Venice-Treacle did break Lent, if given at that Time; He answered, he did not believe it: I told him how he should be convinced, viz. If that Leg was kept a good while in a damp Cellar, it would yield and stink like very Carrion, tho' it was at least 3000 years old; which thing happened to one in London, so carelessly laid by.

M. Colbert shewed us Serveto's Book, for which he was Burnt at Geneva; bought at an Auction in England for 25 Crowns. The Title is, De Trinitatis Erroribus Libri 7. per Michaelam Serveto alias Reves ab Aragonia Hispanum 1531. I had forgot the particular place where the Circulation of the Blood through the Lungs is mentioned: but he told me very Civilly, I should have it Transcribed at any time.

On the austere life of the monks:

It is wonderful to consider how most of the rest of the Orders abuse themselves for God's Sake, as they call it. Hunger and Ill-Diet not only destroys a Man's Health, but Maugre all his Devotion, puts him out of Humour, and makes him Repine and Envy the rest of Mankind; and well if it do not make him also Curse in his Heart his Maker; Job is not every Man's Roll to Act. The Original and Rise of Natural Philosophy and Physick was to Invent a more wholesome and better Food, than the Beasts have, and to Eat Bread and Flesh instead of Herbs and Corn; to Drink Wine instead of Water; those, and a thousand other things were the Blessings of Physick, and still the good management of these things, both in Health and Sickness, are under the Directions of the Physitians. Now for a sort of Melancholly and Willful Men, to renounce these Comforts, and destroy their Healths, and all this upon a pretended Principle of Religion and Devotion, seems to me, I confess, great Ingratitude to God the Author of it . . .

Indeed, I heartily pitied F. P. an industrious honest Man, after his return from the Indies, who was nothing but Skin and Bone; and yet by the Rules of his Order he could not Eat anything that was wholesome and proper for his Cure; nothing but a little slimy nasty Fish and Herbs: And tho' he took, as he told me, Hypocochoana five times, it had no effect upon him. 'Tis true I never heard him complain; But what will not blind prejudice do against all the Reason of Mankind. I know some of these Men have been useful to Mankind by their Studies; but the very same men would have been much more, had they staid with their Neighbours, and Taught the World by their Conversation and Example; Wisdom, and Justice, and Innocence, and Temperance, which they highly pretend to, are not things to be hid in Corners, but to be brought forth to Instruct and Adorn the Age we live in: To abandon the World, and all the Conveniences of Life and Health, is (let them say what they please) the height of Chagrin, and not Religion . . .

At Hubins the Eye-maker, I saw Drawers full of all sorts of Eyes, admirable for the contrivance, to match with great exactness any Iris whatsoever: This being a case, where mismatching is intolerable . . .

The Diet of the Parisians consists chiefly of Bread and Herbs; it is here, as with us, finer and courser. But the common bread, or Pain de Gonesse, which is brought twice a week into Paris from a Village so called, is purely white, and firm and light, and made altogether with Leaven; mostly in 3 Pound Loaves, and 3d a Pound. That which is Bak'd in Paris is courser and much worse. In Lent the common People feed much on White Kidney Beans, and white or pale Lentils, to be had already boiled in the Markets. This Lentil is a sort of Pulse we have none of in England . . .

There are here no round Turneps; but all long ones and small; but excellently well tasted. The Potato are scarce to be found in their Markets, but there are store of Jerusalem Hartichokes. They delight not much in Cabage but there are vast quantities of large Red Onions and Garlick. Also Leeks, Rockamboy, and Shallots are here in great use. There is no Plant of the Onion Kind so hardy as this, and so proper for the cold Mountains; witness the use the Welsh have made of them from all Ages; and indeed it is excellent against Spitting of Blood, and all Diseases of the Throat and Lungs. The Lettice is the great and universal Sallet. In April and May the Markets were served with vast quantities of White Beets. Asparagus is in great plenty. They are to be commended for their love of Sorrel, for nothing is more wholesome, and it is good to supply the place of lemons, against the Scurvy, or any ill habit of the Body . . .

The French delight in nothing so much as Mushroomes, which they have daily, and which all the Winter long they raised on hot Beds in their Gardens. They make long narrow Trenches, and fill with Horse Dung 2 or 3 ft. deep, on which they throw the common Earth of the place, and cover the Dung with it, like the ridge of a House, high pitched; and over all they put long Straw or long Horse Litter; Out of this Earth springs the Champignons after Rain, or watering the Beds every day, even in Winter. On some Beds they have plenty, on others but few, which demonstrate they come of Seed in the Ground; for all the Beds are alike. They prepare their new Beds the latter end of August, and have plentiful Crops of Mushrooms towards Christmas, and all the Spring, till after March . . .

Moriglio's too are eaten. This sort of Mushroom is much esteemed in France, and is mostly gathered in Woods at the foot of the oak; The French say there are no bad Moriglio's; but there are bad Mushrooms. I am persuaded the harm that comes from eating them, is from the noxious Insects and Vermin that feed upon them, and creep into them . . .

There is plenty of Macreuse, a sort of Sea Duck. They are reckoned and esteemed as Fish, and have a rank fishy taste. At our Treat at the King's Charge at Versailles a Macreuse Pye near two foot diameter, for it was in Lent, which being high Seasoned, did go down very well with rare Burgundy. There is a better Argument in Leewenhoeke for Birds participating something of the nature of Fish, though their Blood is hot, than any the Council of Trent could think of, and that is, that the Globuli of the Blood of Birds are Oval, as those of Fishes are; but this will take in all the Bird Kind; which also in time those Gentlemen may think fit to grant . . .

As for their Flesh, Mutton, and Beef,

they are good in their Kind, but their Veal is not to be compared with ours; being red and coarse; and I believe no Countrey in Europe understands the Management of that sort of Food like the English. Nothing contributes more to the whiteness and tenderness of the Flesh of Calves, than often Bleeding them, and giving them much food of Milk and Meal, besides sucking the Dam. By much Bleeding the red cake of the Blood is exhausted, and becomes all white Serum or Chyle . . .

As for their Fruits we had little save Winter Fruits. We tasted Bon Chritiens, Kentish Pippin, and the Winter Calvil or Queening, which though a tender and soft Apple, yet continued good till after Easter. Also the Pome d'Apis, which is a small flat Apple, very beautiful, very red on one side, and pale or white on the other, and may serve the Ladies at their Toilets for a Pattern to Paint by . . .

The Wines of Burgundy and Champagne are most valued; and indeed, not without reason; for they are light and easie upon the Stomach, and give little disturbance to the Brain, if drawn from the Hogshead, or loose bottled after their Fashion. Strong waters, Ratafia in particular, are drunk at Desert. Ratafia is a sort of Cherry Brandy made with Peach and Apricot Stones. The pungent and acrimonious quality of these and such like Kernels was not unknown to the Ancients, and very poisonous to some Animals. Dioscorides tells us, a Paste made of the Kernels of Bitter Almonds will throw Hens into Convulsions, and immediately kill them. Birds have but little Brain, and so are the stronglier affected with this Volatil Venom. Not unlike effects 'tis possible Ratafia may have in some tender and more delicate Constitutions, and Weak and feeble Brains, and may be one cause of so many sudden Deaths, as have been observed of late . . .

The long War has introduced the drinking at table of many sorts of Strongwaters, and strong Wines, which Custom is new. Sure I am, the Parisians, both Men and Women, are strangely altered in their Constitutions and Habit of Body; from lean and slender, they are become fat and corpulent, the Women especially; Which, in my opinion, can proceed from nothing so much as the daily drinking strong Liquors. The daily use of Coffee with Sugar, Tea, and Chocolate, also adds considerably to their Corpulency. What else but a Wanton Luxury could dispose these People, who abound in Excellent Wines, to ape the necessity of others. Mighty things, indeed, are said of these Drinks, according to the Humour and Fancy of the Drinkers. I rather believe they are permitted by Gods Providence for the lessening of the number of Mankind by shortening Life, are a sort of silent Plague. Those that plead for Chocolate, say, it gives them a good Stomach, if taken two hours before Dinner. Right! who doubts it? You say you are much more hungry having drunk Chocolate, than you had been if you had drunk none, that is, your Stomach is faint, craving and feels hollow and empty, and you cannot stay long for your Dinner. Things that pass thus soon out of the Stomach, I suspect are little welcome there, and Nature makes haste to get shut of them. There are many things of this sort which impose upon us by procuring a false hunger. The Wild Indians, and some of our People, no doubt digest it; but our Pampered Bodies can make little of it; and it proves to most tender Constitutions perfect Physic, at least to the Stomach, by cleansing that into the Gutts, but that wears it out, and decays Nature. The old Romans did better with their Luxury; they took their Tea and Chocolate after a full Meal, and every Man was his own Cook in that case. Caesar resolved to be free, and eat and drink heartily, that is, to excess, with Tully; and for this purpose Cicero tells his Friend Atticus, that before he lay down to Table, Emeticen agebat, which I construe, he prepared for himself his Chocolate and Tea; something to make a quick riddance of what they eat and drank, some way or other . . .

The Water of the River Seine is very pernicious to all Strangers, causing Looseness, and sometimes Dysenteries. But those who are careful of themselves purifie it by filling their Cisterns with Sand, and letting it sink through it. The Spring Water from the Maison des Eaux is wholsom but very apt to give the stone, which the People of this Town are infinitely subject to. Chancing to see a great quantity of Earthen Pipes, which had served to convey this water I observed that of 4 inches diameter the hollow of the Pipes were all stopt up to the breadth of a Shilling, with a firm Stone petrified. Now what petrifies in the Water-pipes is apt in some weak Constitutions to Petrifie also in the Kidneys and Bladder . . .

The Parisians divert themselves chiefly in Plays, Gameing, Walking, or Coaching. I heard at the theatre many Tragedies, but without gust for want of Language: But the Little Plays were very Diverting to me, particularly those of Moliere. Tis said, Moliere Died suddenly in Acting the Malade Imaginaire: Where is a good instance of his well Personating the Play he made, and how he could really put himself into any Passion he had in his Head. Also of the great danger strong and vehement Passions may cause in weak Constitutions, such as Joy and Fear; which History tells us, have killed many very suddenly. He is reported to have said, going off the Stage, Messieurs, Jay joue le Malade Imaginaire; mais je suis veritablement fort Malade; and he died within two hours after. This account of Moliere is not in his Life by Perault, but it is true . . .

Moliere sent for Dr. M— a Physician in Paris of great Esteem and Worth, and now in London, a Refuge. Dr. M- sent him word, he would come to him, upon two conditions; the one, that he should answer him only to such Questions as he should ask him, and not otherwise Discourse him; the other, that he should oblige himself to take the Medicines he should prescribe for him. But Moliere finding the Doctor too hard for him, and not easily to be dupt, refused them. His Business it seems, was to make a Comical Scene in exposing one of the Learnedest Men of the Profession, as he had done the Quacks. If this was his Intention, as in all probability it was, Moliere had as much Malice as Wit; which is only to be used to correct the Vitiousness and Folly of Men pretending to Knowledge, and not the Arts themselves . . .

This I must needs say, That Obscenity and Immorality are not all upon the French Stage, no more than in the Civil Conversation of People of Fashion and Good Breeding . . .

Gaming is a perpetual Diversion here if not one of the Debauches of the Town. But Games of meer Hazard are strictly forbid. And indeed, such quick Games, as Basset, Hazard, etc. where Fortune in a manner is all in all, are great Temptations to Ruine, by the sudden Passions they are apt to raise in the Players: Whereas Games, where Skill and Cunning, and much Thought are imployed, as well as Luck, gives a Man time to Cool, and recover his Wits, if at any time great Loss shall have Dismounted his Reason; for he must quickly come to himself again, or forfeit his Skill and Reputation in Conducting the Game, as well as Husbanding his Money.

While dining at St. Clou, we drank our Wine in Ice, which I was not aware off, till I found the bad effect of it in my Throat; and the next day much more; but it went off again without any great trouble. There is no Animal that abuses itself in Meat and Drink, as Man does; we daily drink excessive hot and excessive cold; in other Creatures its Instinct that guides them, but as for us we neither act by Instinct, nor Reason, but betwixt both loosely, and therefore oftner are catcht, to our own destruction.

The Air of Paris is dryer than that of England, the rainfall in the latter being twice as much. Our fields are much greener but we pay dearly for it, in Agues and Coughs, and Rheumatick Distempers. The Winter was very rude and fierce, as was ever known in the Memory of Man; The cold Winds very piercing; and the Common People walk the Streets all in Mouffes, and Multitudes had little Brass Kettles of Small-coal kindled, hanging on their Arms; and yet you should scarce hear any one Cough. Another Argument, of the Dryness of the Air at Paris, we had from the alteration of Health; such as were thick Breathed, and Cought and Spit much, soon recovered, and the insensible perspiration of the Skin was so clear and free, that the Kidneys had little to do; so that it was observed by most, that though we drank pretty freely of the thin Wines of Champagne and Burgundy, yet they never broke our sleep to get shut of them; and that very little passed that way in the morning. Lastly, a sign of the Driness and great goodness of the Air of Paris is, the vast number of Iron Bars all over the City; which yet are mostly intire, and the least decayed with Rust, I ever saw in any place; whereas ours in London are all in a few years all over rusty, and miserably eaten.

We were sufficiently alarmed at our first coming to Paris, with the unwholesomeness of the River Water, and cautioned against drinking it; and yet it was almost impossible to avoid the bad effects of it, for within the month two thirds of the Family fell into Fluxes, some into Dysenteries, and some very ill of it. The French that come out of other remote Countreys suffer as well as the Strangers. We were told boiling it was a good Remedy to prevent its Griping Quality; but that is a meer Notion, for we know Mineral Waters boiled have a stronger effect, and this quality can proceed from nothing less. The Well Waters here are much worse than the River Waters, because more Mineral. But our safety was in the Water brought from the Maison des Eaux, where the Aqueduct of Arcueil empties itself to serve the great Palaces and City Fountains . . .

The Disease of the Dysentery being one of the most common in Paris, the most celebrated Drug for its cure is now the Hypopecouana; though I never once made use of it to any of our People, but cured them all as soon, and as well with our usual Remedies. Indeed they have great need of it here, for the poorer sort of People, through ill Diet, this Water, and Herbs, are very subject to it; This Root is said to cure it with as much certainty, and as readily, as the Jesuits Powder an Ague; Of this most of the Physicians and Apothecaries agreed. They give it in Powder from 10 grains to 40, which is the largest Dose. It most commonly Vomits, and sometimes Purges, but both gently. 'Tis sold here from 20 to 50 Crowns a Pound. They divide it into 4 sorts, according to its goodness.

Another popular Disease here is the Stone; and there are Men well practised in the Cutting for it. There are also two Hospitals, where great numbers are cut yearly, as La Charité, and Hostel-Dieu, in both of these there are Wired Chests full of Stones cut from Human Bodies; and in the Chest of La Charité is one, which exceeds all belief; it was cut from a Monk, who died in the very Operation; it is as big as a Childs Head. It is but the Model or Patern of the Stone which is kept in the Chest; which has this Inscription on it.

> Figure et grosseur de la pierre, pesant 51 ounces, qui font trois livres trois ounces, qui a esté tirée dans cet Hospital au mois de Juin 1690, et que l'on conserve dans le couvent de la Charité.

But that which I shall here most insist upon is the *new way*, practised by Pere Jaques, a Monk. About the 20th of April he cut in the Hostel-Dieu 10 in less than an hours time: The 3rd day after, all were hearty and without pain but one. He cuts both by the grand and little Appareil; in both he boldly thrusts in a broad Lancet or Stilleto into the middle of the Muscle of the Thigh near the Anus, till he joins the Catheter or Staff, or the Stone betwixt his Fingers; then he widens the incision of the Blader in proportion to the Stone with a Silver Oval Hoop; if that will not do, he thrusts in his 4 Fingers, and tears it wider; then with the Ducks Bill he draws it out . . .

I saw him cut a second time in the Hostel-Dieu; and he performed it upon 9 Persons in 3 quarters of an hour, very dexterously. He seemed to venture at all; and put me into some disorder with the cruelty of the Operation; and a stouter Englishman than my self. However I visited them all in their Beds, and found them more amazed, than in pain.

Pere Jaques cut also his way in the other Hospital La Charité much about the same time, 11 at twice. Here Monsieur Marshal, the best of the Surgeons for this Operation now in Paris, harangu'd against him before the Governors, who coldly answered, they would be determined by the Event, which way was best.

> Atque hac ratione Faeminis Calculi omnium facillimè exciduntur; nempe scalpello intra vaginam uteri in vesicam adacto.

Of those cut in La Charité one died; and being dissected, it was found he had his Bladder pierced in 4 or 5 places; also the Musculus Psoas sadly mangled; also the left Vesiculae Seminales cut. Notwithstanding this, if this Method was well executed by a Skilful Hand, it might be of good use to Mankind. This way of Cutting for the Stone, puts me in mind of what I formerly writ and publisht in the Phil. Transactions, about Cutting above the Os Pubis, in the Fund of the Bladder. Also of that Experiment of Cutting for the Stone of an Alderman of Doncaster in the Gluteus Major, he was twice cut in the same place, and out-lived both. I saw the first Stone, which was very large, and in some measure transparent, Crystal like. This Experiment is Printed in Dr. Willies Scarborough Spaw, 14 years ago at least, and is a fair hint for this new Method . . .

Since my return I had a Letter from Mr. Probie, a very Learned and Industrious young Gentleman, who was with me to see the Operation, that part relating to this Matter I shall here transcribe. Indeed, I mightily longed for an Account of this Matter, the success of which I came away too soon to learn anything for certain . . .

Paris, Aug. 2.98. Pere Jaques Reputation mightily slackens, out of Forty five that he cut at the Hostel Dieu, but sixteen of them survive; and of Nineteen in the Charité, but eleven. He has practised at the Hospitals at Lyons, but, 'tis said, with worse success than at Paris. I am sensible he has got abundance of Enemies, which makes me very often question, what I may hear said of him. Dr. Fagon, the King's Physician, told Dr. Turnfort, when he went to present his Book to him, that he had cut Seven at Versailles, and that six of them are alive, and as well as if never cut. The Person that died was so Distempered, that he was not expected to live, and 'twas thought, if he had not been cut, he had not lived so long: The Surgeons have a great mind to cry down the Man, though they practise his Method. For Marshal has since cut after Pere Jaques's Manner, only with this difference, that Marshal's Catheter was cannulated. Le Rue, the second Surgeon of the Charity Hospital cut after the old Manner, at the same time when Marshal cut Pere Jaques's way, but had not so good success as Marshal had; for all that Marshal cut are alive and very well, whereas the other lost one or two of his number; besides, those that lived were not so soon cur'd, no, not by a month or six weeks. Thus far Mr. Probie . . .

The Pox here is the great Business of the Town; a Disease which in some measure hath contributed to the ruine of Physick here, as in London. This Secret Service hath introduced little Contemptible Animals of all sorts into Business, and hath given them occasion to insult Families, after they had once the knowledge of these Misfortunes. And it is for this reason the Quacks here, as with us, do thrive vastly into great Riches beyond any of the Physicians, by treating privately these Calamities. It was a pleasant Diversion to me to read upon the Walls every where about the Town, but more particularly in the Fauxbourgh of St. Germain, the Quacks Bills Printed in great Uncial Letters. As,

> De par l'ordre du Roy.
>
> Remede infallible & commode pour la gerison des maladies secretes sans garder la chambre.

Another,

> Par permission de Roy.
>
> Manniere tres aisee & tres sure pour guerir sans incommodite, & sans que persone en appercoive, les maladies veneriennes, &c.

Another,

> Par privilege du Roy,
>
> L'Antivenerien de medicin Indien, pour toutes les maladies veneriennes, telles quelles puissent estre, sans aucun retour, & sans guarder la chambre. Il est tres commode & le plus agreable de monde.

Another,

> Remede assure de Sieur de la Brune privilege du Roy, &c. sans qu'on soit contraint de garder la chambre, &c.

By these Bills it is evident, there is yet a certain Modesty and Decorum left in the Concealing this Disease, even amongst the French; They would be Cured secretly, and as though nothing were doing; which those Wretches highly promise. But this is that Handle which gives those mean People an occasion to insult their Reputation, and injure them in their Health for ever. Every body here puts their helping Hand, and meddles with the Cure of this Disease, as Apothecaries, Barbers, Women, and Monks; yet I did not find by all the inquiry I could make, that they had other Remedies than we. Nay, there is something practised in the Cure of this Distemper in England, which they at Paris know nothing of; but this old Verse forbids me to say any thing further.

Artem pudere proloqui, quam factites.

I had the opportunity of Conversing with many of the Physicians in this City; who all agree in the low Condition and Disesteem it was in, from the boundless Confidence and intruding of Quacks, Women, and Monks. Monsieur d'Achin, the late chief Physician, has been ill thought of for taking Money and giving protection to these sort of Cattle; but the chief Physician now, Monsieur Fagon, is a Man of great Honour and Learning, and very desirous to promote the Art . . .

It is here as with us, some practise out of meer vanity, others to make a Penny any way to get Bread. The cause of all this is, I think, the great Confidence People have of their own Skill, an arrogance without thinking. To pass a Judgment upon Cures, and the good and evil practice of Physick, without doubt is one of the nicest things, even to Men of the Faculty; but a Jury, that is, the very ordinary Men in England, are suffered now to undertake the Question; when I may truly say, that I have ever found, no disparagement to them, the most Learned Men of the Nation, the most mistaken in these Matters; and can it be otherwise in so Conjectural an Art, when we our selves scarce know, when we have done ill or well . . .

Another cause of the low Esteem of Physick here, are the sorry Fees that are given to Physicians; which makes that Science not worth the Application and Study. The King indeed is very liberal, as in all things else, in his Pensions to his chief Physician, and gives his Children good Preferments. Also Mr. Burdelot, who is also well Pensioned, and lodged at Versailles, Physician to the Dutchess of Burgundy, a Learned Man; he is perfectly well Skill'd in the History of Physick; and we may shortly (as he told me) expect from him, another Supplement to Vander Linden, of many thousand Volumes, which have escaped that Catalogue, and are not accounted for . . .

Monsieur, and the Dauphin, and all the Princes of the Blood, have their Domestic Physicians; some of whom I Knew, as Monsieur Arlot, M. Minot, to the Prince of Conty, of my acquaintance formerly at Montpelier. The Two Morins very Learned Men; also M. Grimodet, &c . . .

Others have the practice of Nunneries and Convents, which gives them Bread; others have Parishes; and some such Shifts they make; but all is wrong with them, and very little incouragement given to the Faculty . . .

April 14. the Prince of Conty sent his Gentleman and Coach at mid-night to fetch me to his Son, and to bring with me the late King Charles's Drops to give him. This was a very hasty call. I told the Messenger, I was the Prince's very humble Servant; but for any Drops or other Medicines I had brought nothing at all with me, and had used only such as I found in their Shops, for all the occasions I had had to use any. I desired he would tell him, that I was ready to consult with his Physicians upon his Sons Sickness, if he pleased to command me, but for coming upon any other Account I desired to be excused; but I heard no more of the Matter, and the young Prince died. By this it is evident, there is as false a Notion of Physick in this Country, as with us; and that it is here thought a Knack, more than a Science or Method; and little Chimical Toys, the Bijous of Quacks, are mightily in request . . .

Those Drops were desired of me by other Persons of Quality, as the Princess d'Espinoy, the Duchess of Boullon, M. Sesac, &c. and having bethought my self how my Master, the late King Charles, had communicated them to me, and shewed me very obligingly the Process himself, by carrying me alone with him into his Elaboratory at Whitehall, while it was Distilling. Also Mr. Chevins another time shewed me the Materials for the Drops in his Appartment newly brought in, in great quantity, that is, raw silk. I caused the Drops to be made here. Also I put Dr. Turnfort upon making them; which he did in perfection, by Distilling the finest Raw Silk he could get. For my part I was surprised at the Experiment often repeated, having never tried it before. One Pound of Raw Silk yielded an incredible quantity of Volatil Salt, and in proportion the finest Spirit I ever tasted; and that which recommends it is, that it is when rectified, of a far more pleasant smell, than that which comes from Sal Armoniack or Hartshorne; and the Salt refined and corrobonated with any well scented Chimical Oil, makes the Kings Salt, as it us'd to be called. This my Lord Ambassador gave me leave to present in his Name; and the Doctor now supplies those which want. Silk, indeed is nothing else, but a dry Jelly from the Insect Kind, and therefore very Cordial and Stomachick no doubt. The Arabians were wise, and knowing in the Materia Medica, to have put it in their Alkermes.

This must be said for the Honour of this King, that he has ever given great encouragements for useful Discoveries in all Kinds, and particularly in Physick. 'Tis well known he bought the Secret of the Jesuits Powder, and made it publick; as he lately did that of the Hypococana.

To Conclude, it was my good Fortune here to have a Bundle of Original Papers of Sir Theodore Mayerne, and his Friends, who Corresponded with him, presented me by the Reverend Dr. Wickar, Dean of Winchester, who Marrying his Kinswoman found them amongst other Writings of Law Matters. I have not had yet the leisure to peruse them, but those who know the Worth of that great Man, will desire they may be made publick, which if they are, they shall come forth intire, and not disguised, as some of his other Papers have been, to the great detriment of Physick; and I think it is the first Example of this Nature, that Posthumous Papers were ever abreviated, and made what they never were, before an intire and full publication.

Lister's Coat-of-arms in the Book of Benefactors of the Ashmolean Museum, Oxford.

SOME PERSONALITIES OF THE HUNTERIAN EPOCH*

By A. E. MORTIMER WOOLF, F.R.C.S.

LONDON

SINCE John Hunter's death, a vast literature has sprung up in the form of books, orations delivered before The Hunterian Society, and annual orations elsewhere. Hence it is impossible, and indeed it would be a mere impertinence, for me to attempt to add anything to the biography of the great man. My object is to attempt to throw into relief certain aspects of his character by a survey of his environment.

In order to deal faithfully with the life of a great man, there are three circumstances that should be especially considered: (1) what he did; (2) his contemporaries, and the condition of the times in which he lived, and (3) the associations which he formed, namely friends, assistants and acquaintances, on whose testimony we are so largely dependent.

In regard to the first of my headings, as I have already said I can add nothing to our knowledge of the work of John Hunter. Suffice it to say that a consideration of what he achieved in the time in which he lived, with all its superstition and ignorance (often disguised under the cloak of pomp and ceremony), reveals the man as a true and discerning student of nature, who succeeded in no small measure in ridding her of the nebulae with which at the time she was enshrouded. Although the Hunterian tradition has been handed down to posterity and will exist for all time, yet little appears to be known of the personalities of John Hunter's period. This study should reveal the influence that John Hunter had on his contemporaries, and possibly how he himself was affected by them.

Amongst these, pride of place must assuredly be given to his most illustrious brother, William Hunter. Everybody who has studied the subject must agree that William Hunter was one of the greatest of men and sometimes, I am afraid, it is too often forgotten that had it not been for the early kindliness, sympathy and teaching of his elder brother, John Hunter's medical work would possibly never have seen the light of day. It was William Hunter who opened the school of anatomy and did dissections; it was William Hunter who started a course of anatomical lectures such as had not been known in London before; it was William Hunter who not only taught John the powers of dissection and imbued him with the principles of accurate scientific investigation, but it was he who acted as inspiring agent of many of the great discoveries which at the time of their publication roused such tremendous controversies.

In connection with the two Hunters, mention must be made of the very great inspiration that William had received from one to whom, in 1736, he became resident pupil, namely William Cullen. I can do no better than quote William Hunter's own words, in which he says that Cullen was the "man to whom I owe much and love most of all men in the world." William Cullen is one of the few examples of medical Scotsmen who returned to his native land after migration to England. Later, William Smellie and William Hunter crossed the border, but remained permanently domiciled in London. The three Williams have to share between them the responsibility for the medical Scots' invasion of England.

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* Presidential Address delivered to The Hunterian Society in October, 1927.

William Cullen was the founder of the Medical School of Glasgow. Like many others of the early and middle eighteenth century, he was not only an authority in the medical world, but was celebrated for his purely scientific work. His chemical lectures were almost as renowned as his clinical ones, more especially as he was one of the first, if not the first, to lecture in English, and not, as was the prevailing custom, in Latin. I cannot refrain from quoting the words of John Robison: "Before William Cullen, chemistry had been treated only as a very curious and useful art . . . Cullen quickly succeeded in taking chemistry out of the hands of the artists, the metallurgists and pharmaceutists and exhibited it as a liberal science, the study of a gentleman." Apart from medical works, Cullen published, in 1755, "Discoveries on the Evolution of Heat in Chemical Combination and the Cooling of Solutions." I mention this, because one of his pupils, namely Joseph Black, became a very famous chemist, and dedicated to him his well-known treatise on "Fixed Air" about 1744.

Joseph Black is another example of a physician who at the same time was a pure scientist. It is interesting to reflect in this connection that at the time of which we are speaking there was, in Glasgow, a combined Chair of Anatomy and Chemistry. Joseph Black succeeded Cullen on his resignation from this position in 1756. Black was also the first to preach the doctrine of latent heat, which not only formed the basis of modern thermal science, but, according to John Robison, who succeeded Black in the Chair of Chemistry, gave the first impulse to Watt's improvement in the steam engine. James Watt was a pupil of Joseph Black, and the two were closely associated in their experimental work. The inspiration that Joseph Black gave to his co-workers and the effect that it had on the mechanical improvements of the eighteenth century, has not received its due meed of acknowledgement. It is not too much to say that Joseph Black's lectures had a powerful effect in popularizing the science of chemistry.

To revert for a moment to Cullen. In his early days he had been a ship's surgeon and it becomes very apparent how valuable from a practical point of view was an appointment as surgeon to one of His Majesty's forces. John Hunter himself was Surgeon at Belleisle to the Expeditionary Force during the Seven Years' War, and it was in this capacity that he began to show marked signs of his own originality. This has been so often commented upon that I need not go into the question now. It resolved itself into leaving wounds alone, rather than assaulting them with energetic treatment. The Army at this time, especially when it was at war, was indeed the happy hunting ground for surgical experience. How vastly has the position changed! And how different today is the surgery of war from that of civil practice!

Curiously enough, while the army was the Mecca of surgery, the Navy was the nursery of medicine. And this is emphasized by a consideration of the lives of two famous naval surgeons of the day, Dr. James Lind and Sir Gilbert Blane.

At this time, the navy was riddled with scurvy. The havoc caused by this devastating disease can be gathered from the fact that in the engagements with the French and Spanish fleets, scurvy had accounted for more deaths than all the various engagements. In 1754, James Lind published "A Treatise on the Scurvy," which attracted great notice, not only in England but throughout the whole of Europe. It is perhaps typical of governments that the Admiralty did not publish an order for the use of lemon juice until forty years after it had been advocated by Lind.

Sir Gilbert Blane was recommended by William Hunter as private physician, first to Lord Holdernesse and then to Admiral Rodney. He sailed with the latter for the West Indies in 1759, and became physician to the Fleet. It was in no small measure due to him that the regulations based on Lind's previous experience and work were introduced eventually into the navy. How greatly Dr. Blane, as he was then, was held in the estimation of Admiral Rodney is best brought to notice by quoting the Admiral's own words: "To Dr. Blane's knowledge and attention it was owing that the English Fleet was, not withstanding their excessive fatigue and constant service in a condition always to attack and defeat the enemy. In my own ship, *The Formidable*, out of 900 men not one was buried in six months."

Later he was appointed physician to St. Thomas's Hospital, and two years afterwards was made Physician Extraordinary to The Prince of Wales. In 1799, he made recommendations which formed the basis of the Quarantine Act of that year. These two names, Lind and Blane, stand predominant in the history of naval medical matters.

At this time, of course, there was no hard and fast distinction between medicine and surgery. Even as late as the day of Sir Astley Cooper, he who was one of the most brilliant of those who came under the Hunterian influence, and one of the most famous surgeons that Guy's Hospital has ever had, in his private practice was frequently consulted on medical matters and did not hesitate to give advice. I quote this on the authority of his nephew, Sir Bransby Cooper, who published a life of his illustrious uncle. But in those days, there was one specialty that stood out rather by itself, namely obstetrics, and in his later days William Hunter himself specialized largely in this branch of practice.

Foremost amongst the obstetricians of this time was William Smellie, whom I have previously mentioned as one of the first Scotsmen emigrating to London. William Smellie in his "Treatise on The Theory and Practice of Midwifery," which was published in 1752, and later in his "Collection of Preternatural Cases and Observations on Midwifery," published in 1754, described more exactly than any previous writer the mechanism of parturition and the curves followed by the infant during birth. It was he who stressed the importance of the exact measurement of the pelvis. William Hunter for some years had lived with William Smellie, and it was probably this influence that attracted him in later years to the practice of obstetrics.

Dr. John Clarke was also another celebrated obstetrician of the day, and he lectured in a private medical school which had been founded by William Hunter. He probably had the largest midwifery practice in London for many years, but towards the close of his life he gave up obstetrics and became a specialist on the diseases of women and children. In 1815, the year of his death, he published the first part of his "Commentaries on Some of the Most Important Diseases of Children," and it is in this that is to be found the first accurate description of the disease of laryngismus stridulus. His practice became so great that he was forced to transfer a considerable portion of it to his brother, Dr. Mansfield Clarke, and Pettigrew, in his "Medical Portrait Gallery," says it was this circumstance that gave rise to the following somewhat ludicrous epitaph:

Beneath this stone, shut up in the dark,
Lies a learned man-midwife, y'clep'd Dr. Clarke
On earth while he lived by attending men's wives,
He increased population some thousands of lives;
Thus a gain to the nation was a gain to himself,
And enlarged population, enlargement of pelf.
So he toiled late and early, from morning to night,
The squalling of children his greatest delight,
Then worn out with *labours*, he died skin and bone[1]
And his ladies he left all to *Mansfield* and *Stone*.

From the foregoing, we can see that these years were what might be termed the birth of medical and allied sciences. The whole essence of the Hunterian teaching was induction from experimental results, a school developed in the midst of a whirlpool of ignorance, superstition and empiricism, survivals of which are to be found even at the present day. The middle of the eighteenth century gave birth to many fantastic theories, in order to explain not only the causation of disease but to elucidate the problem of life itself. And this perhaps is best exemplified by the writings of one John Brown. At one time the faithful disciple of Cullen, who, in spite of promises, befriended him but little, John Brown eventually left his master and published a book, entitled "Elementa Medicinae," which aroused great excitement and controversy throughout Europe. In this country any candidate who presented himself for a degree, and whose discourse countenanced in any manner the Brunonian Doctrine, was sure to be rejected. In Germany, Brown's opinions gained great favor, and Pettigrew asserts that he was looked upon as a medical Luther. I quote Pettigrew's words: "At the University of Göttingen, the pupils were excited to rebellion by the intensity of the discussions and the military were called in to quell the disturbance."

The Brunonian Doctrine was the direct heritage of gout, which has often, in the past, served as the altar of sacrifice for faddists. John Brown himself was a victim not only to this disease, but to the "lowering treatment" which was so popular at this period. Despite this therapeutic method in one year he suffered from no less than four attacks. Cogitation over his misfortunes gave birth to his extraordinary doctrine, which, in short, was as follows (I again quote from Pettigrew):

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[1] Written in Dr. Clarke's lifetime "by a facetious member of the profession who was pleased to sport in what he called 'Nugae Canonae, or Epitaphian Mementoes of the Medici Family of modern times.'" (See Pettigrew, "Medical Portrait Gallery.")

> Life he regarded as a *forced* state dependent upon the presence of exciting powers, as much as of the excitability itself. If the excitement be too great, weakness is induced; but it is of a different nature—it is *direct* debility . . . All diseases of the body he regarded as occasioned either by direct or indirect debility, in consequence of too much or too little stimuli. The general diseases arising from excessive excitement are called *sthenic:* those that originate from a deficient excitement *asthenic.* The indication for the cure of sthenic diathesis he says is to diminish, that for the cure of asthenic diathesis is to increase the excitement, till that degree which constitutes the mean betwixt its extremes, and which is suited to good health be restored.

John Brown was no quack, as can be gathered from the following story: He was approached on one occasion to give his name to a certain nostrum to be put on the market as "Brown's Exciting Pill!" At the time he was in financial stress, and was actually in prison for debt. Nevertheless he refused the offer.

The system that Brown preached had undoubtedly great influence on the practice of medicine; it probably did more than anything else to abolish the humoral pathology which existed at that day, and it helped in no small measure to introduce a more rational and philosophical spirit of inquiry.

I have little doubt that at the period of which we are speaking witchcraft had a great influence on medical treatment. As late as 1895 a witch was burnt at Clonmel in Ireland. In Scotland a witch was burnt in 1722, that is only six years before John Hunter's birth. England, perhaps, was a little more enlightened, as the last authentic case was in 1682. Nevertheless in England, the statute for the abolition of the death penalty for witchcraft was passed as late as the reign of George II. Superstition dies hard, and, in fact, is alive today, which may be one explanation of the traditional love of mankind for quacks and miracles. The words of Sir James Frazer in "The Golden Bough" are very apt. Referring to the acceptance of modern religious thought by the common people, he says: "They yield a dull assent to it with their lips, but in their heart they never abandon their old superstitions . . . and to these in the trials and emergencies of life they have recourse as to infallible remedies . . . " The belief in the royal touch for the King's Evil is a very good case in point, and it is related by Dr. John Douglas, Bishop of Salisbury, how Ambrose Dickins, one of the first surgeons of St. George's Hospital, was a great believer in this remedy. In 1754, the Bishop published a book entitled "The Criterion," which upheld belief in miracles. The case the Bishop quotes reads very much like some of the advertisements we see today in the daily papers of the miraculous cures due to this or that nostrum. Mr. Dickins, who, at the time, was Sergeant Surgeon to Queen Anne, is cited as having been instrumental in obtaining the royal touch for large numbers of persons. The specific case quoted is as follows:

> A woman came to Mr. Dickins begging that he would present her to be touched by the Queen. As from her appearance he had no great opinion of her character, he told her the touch would be of little service to her, as he supposed she would sell her medal, which must continue to hang about the neck to make the cure

lasting. She promised to preserve it, was touched; had the medal given to her; and soon after her sores healed up. Forgetting her promise, and now looking upon the piece of gold as useless, she disposed of it; but soon her sores broke out once more. Upon this, she appealed to Mr. Dickins a second time, earnestly entreating him to present her again to the Queen. He did so, and once more she was cured.

One of Ambrose Dickins's colleagues at this time was William Cheselden, who was co-opted as a Member of the Staff at the time of the formation of St. George's Hospital, a surgeon of lasting reputation, yet, as we shall see later, unable entirely to shake off the survival of old superstition.

William Cheselden was one of the last Wardens of the Barber-Surgeons Company, before the separation of the surgeons from the barbers, and his name will always be a landmark in surgery for his wonderfully successful performance of the "lateral operation for stone." Although this operation had been performed previously by a friar, Frère Jacques, in Paris, and its technique had subsequently been improved by Rau, a professor at Leyden, Cheselden modified it so that it came to be known as his "lateral stone operation." This was first performed by him on the twenty-seventh of March, 1727, and it is on record that on one occasion he did the operation in fifty-four seconds, to the great astonishment of a French surgeon who was watching him. According to Dr. J. F. Payne, his fee was 500 guineas. Cheselden was not only a great surgeon, but a great anatomist, and his "Anatomy of the Human Body" ran into thirteen editions.

The present day has made us familiar with woman's place in the sphere of medicine. Although this is, comparatively speaking, a new development, yet even in Hunter's time woman was making herself felt in medical matters.

About the middle of the eighteenth century, there flourished two famous women quacks, Joanna Stevens and Mrs. Mapp.

Mrs. Stevens is characterized by Jeaffreson as a "wise woman," but nevertheless she was an ignorant and vulgar creature. She declared that she had discovered a sovereign remedy for a painful malady, the nature of which I have been unable to trace. She was a courageous person, and interviewed peers, bishops, duchesses, who believed in her and testified to the marvellous cures that she effected and moreover allowed her to make use of their titles "to all sceptics in respect of her powers." In *The Gentlemen's Magazine* for the year 1738, is to be found the following paragraph: "Mrs. Stevens has proposed to make her medicine publick on consideration of £5,000 to be raised by contribution and lodged with Mr. Drummond, Banker. He has received since the 11th of this month about £500 on that account." Various people of title and otherwise, including bishops, subscribed from 5 up to 50 guineas, but the total subscriptions only amounted to £1,356. 3. 0. However, Joanna remained firm; nothing less than 5000 pounds would suffice, and eventually Parliament appointed a commission that enquired into the particulars of the cures claimed by Mrs. Stevens. As a result she was awarded a certificate signed by twenty distinguished people, including William Cheselden, Sir Caesar Hawkins and Dr. Samuel Sharpe. Finally, the nation, out of its taxes, made up the requisite sum of £5,000. I will not weary you with the description, which is a long one, of the various pills and powders—minute directions are given for the use of egg-shells, snails, swines' cresses burnt to blackness and various other ingredients. But it is interesting to reflect that Parliament had no hesitation in recommending that this money be subscribed, and yet a few years later the nation grudged an adequate reward to Jenner, and were unwilling to purchase the museum of John Hunter.

Mrs. Mapp was a contemporary of Mrs. Stevens. She lived at Epsom, and used to drive about London in a most wonderful carriage. She was enormously fat, ugly and drunken. In her cups she became a screaming and abusive harradan. This lady was a bone-setter, and so great was her reputation that the town of Epsom offered her £100 if she would reside there for one year. In the heyday of her success, she married a young husband, but her matrimonial bliss was short-lived, inasmuch as the end of a fortnight, the faithless one decamped with 100 guineas of her earnings. However, as Jeaffreson says, "She found consolation, for her wounded affections in the homage of the world." So famous was she that a song about her was sung on the Stage:

You surgeons of London, who puzzle your pates,
To ride in your coaches, and purchase estates,
Give over for shame, for pride has a fall,
And the doctress of Epsom has out-done you all.

What signifies learning or going to school,
When a woman can do, without reason or rule,
What puts you to nonplus, and baffles your art;
For petticoat practice has now got the start.

In physic, as well as in fashions, we find
The newest has always its run with mankind;
Forgot is the bustle 'bout Taylor and Ward,
And Mapp's all the cry, and her fame's on record.

Dame Nature has given a doctor's degree—
She gets all the patients and pockets the fee;
So if you don't instantly prove her a cheat,
She'll loll in her carriage, whilst you walk the street.

The Taylor mentioned in this ditty was a somewhat celebrated person, who had been a pupil of Cheselden, and subsequently became notorious as a specialist in diseases of the eye. He started practice in Norwich as a general surgeon and oculist, but as this venture had no success, he conceived the idea of touring the country. He styled himself, and was always known as, "The Chevalier Taylor." His method of obtaining practice was by delivering lectures in the most extravagant terms and extraordinary language. His orations were bombastic to a degree and his object was to deliver them in what he termed "the true Ciceronian, prodigiously difficult and never attempted in our language before." As an example, I may quote a few sentences which formed the beginning of an oration which was delivered at the University of Oxford:

> The eye, most illustrious sons of the muses, most learned Oxonians, whose fame I have heard celebrated in all parts of the globe—the eye, that most amazing, that stupendous, that comprehending, that incomprehensible, that miraculous organ, the eye, is the Proteus of the passions, the herald of the mind, the interpreter of the heart, and the window of the soul. The eye has dominion over all things. The world was made for the eye, and the eye for the world.

Taylor made great pretensions to learning, but Dr. Johnson declared him an instance of how far impudence will carry ignorance. In 1736, he was appointed oculist to George II.

There can be no doubt that ophthalmic surgery at this time was largely in the hands of the quacks, and it is lamentable that Taylor, with all his undoubted gifts and skill, was unable, or did not choose, to forsake the methods of the charlatan.

Happily, five years after his death, James Ware, who had previously been demonstrator of anatomy in St Thomas's Hospital, became assistant to Jonathan Wathen, a surgeon who devoted himself principally to diseases of the eye. This partnership was dissolved fourteen years later, and Ware, on his own account, practiced as a specialist in ophthalmic surgery. It is not too much to say that Wathen and Ware between them elevated ophthalmic surgery from the depths into which it had sunk and to them must be ascribed the credit of placing this speciality on a proper basis and giving to it a respectable foothold. So much for the quacks.

It was perhaps fortunate for many in those days that there was no such tribunal as The General Medical Council, as some of the devices resorted to even by well-known physicians would speedily have brought them under that body's jurisdiction. It is related of one John Huxham, who was a well-known physician in practice at Plymouth, that he used to arrange to be called out of church during service. He then galloped on horseback through the town affecting extreme gravity of demeanor. According to the custom of the time, he wore a scarlet coat, carried a gold-headed cane, and was followed by a footman, bearing his gloves. His great achievement was the publication of a book entitled "On the Malignant Ulcers of the Throat," which contains an account of diphtheria.[2] John Huxham most certainly deserves the credit for being the first to observe the palsy of the soft palate as a consequence of that disease.

As I have said, physicians at this time often had other interests besides that of medicine. A notable example was Dr. Mark Akenside, whose real metier was poetry. His father was a butcher, and young Akenside was originally destined, like so many others who eventually found themselves in the medical profession, for the church. At an early age, however, he forsook this vocation and when only twenty-three years of age published "The Pleasures of the Imagination," on which work his fame largely depends. The story of the publication of this poem is perhaps the best criterion of its value. The publisher submitted the MS. to Pope for an opinion. One hundred and twenty pounds had been asked for it. Pope advised the publisher to make no niggardly offer, because this was no everyday writer. Unfortunately Akenside's literary ability was not reflected in his medical activities, and this was partly due to his overbearing, rough and brutal manner. On one occasion this brought him into conflict with the Governors of St. Thomas's Hospital. Akenside's publication of his paper "De Glandulis Lymphaticis," incited the Monros of Edinburgh to attack him on the ground of plagiarism. But Akenside was not the only sufferer. The Monros also attacked the Hunters with great acrimony and caused a controversy that has been so often commented upon that I need not dilate upon it now.

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[2] There is some doubt as to whether the original description by Huxham really was diphtheria: "The epidemics described by . . . Huxham probably included both diphtheria and scarlet fever as well as examples of ulcerative sore throat or pseudo-diphtheria." (Rolleston, J. D. Acute Infectious Diseases. 1925, pp. 1–2.)

I suppose that jealousy is one of the most tragic frailties of human nature, and these times reveal it at its bitterest. Not even the best brains of the scientific world were able to rise supreme to the temptations of polemics. The Hunters themselves accused Percival Pott of plagiarizing their ideas in his treatise on "Hernia Congenita." But perhaps the most violent diatribe that has ever been published in the whole of medical history was contained in a book, "The Life of John Hunter," published by one Jesse Foot after Hunter's death. This book is an attack on the work of both Hunters, more especially of John. Space will not permit me to abstract its bigoted outlook. It served the purpose of bringing Jesse Foot's name down to posterity, but in a way which he himself perhaps would hardly have desired. The book is worth reading, because, apart from its inherent interest, it is one of the best examples I know of folly attacking wisdom. The study of all these controversies throws into relief so clearly personal animosities which tend to cast into shadow, or even obscurity, the research that engendered them. Happily, posterity has revealed the value of the Hunters and plunged into oblivion Jesse Foot.

The study of anatomy has always been associated, and perhaps not unnaturally, with diverse difficulties and administrative formalities in the collection of material. Fortunately, nowadays, it comes into the anatomy room surreptitiously, and without the ceremony that sometimes obtained in the times of which we are speaking. In the days of the old Barbers' Company, before 1745, four demonstrations were held per annum, which were termed "public anatomies." The subject was a malefactor, who had been executed at Tyburn. The ceremony of conducting the body from the place of execution was often attended with riots amongst the people, and the Company not infrequently had to prosecute the rioters and compensate the Beadle of the Company who had sustained injury in his task of conveying the body. I will quote two items which appear in the accounts of the Company:

1739.	Item. Paid the Beadles for their being beat and wounded at the late execution..............	£4. 4. 0
1740.	Item. Paid for mending the windows broke upon bringing the last body from Tyburn......	6. 0

Sir Norman Moore relates that when Sir William Blizzard was President of the College of Surgeons, he attended at the house in Cock Lane, where the College was then situated, in full court dress to receive the bodies from the hangman. The contrast between the elaborate costume and formal manner of the President and the surly suspicious bearing of the executioner is described by Professor Owen as having made the ghastly scene almost ludicrous.

Sir William Blizzard had a wonderful career in initiating many new ideas and institutions. He was President of the Hunterian Society for the first three years and it is on record that his was the first regular fee for membership to be received. He founded the Medical School of the London Hospital, and also the Samaritan Society of that institution. So valuable were his services to the Hospital considered that he was not allowed to retire, and the House Committee passed a resolution that it was most desirable for the hospital to secure the connection of Sir William Blizzard during the remainder of his valuable life. This is probably the origin of the custom of the appointment of consulting physicians and surgeons to London hospitals after their retirement from the active staff. He and Sir Everard Home were the two first professors of anatomy to the new Royal College of Surgeons. It is not generally known that it was at Sir William Blizzard's instigation that his old friend and pupil, Samuel Jackson, bequeathed the Jacksonian Prize. Truly a great name in the Hunterian Society, a great name in our profession. He originally had been a pupil of John Hunter.

There is an amusing story told of Abernethy, another famous pupil. Abernethy was a man who, despite his many kindnesses and his many virtues, so well known to his friends, yet possessed manners which were the reverse of endearing him, above all to his patients, and yet he enjoyed a very large practice. As Jeaffreson puts it: "Abernethy is a by-word for rudeness and even brutality of manner, but he was as tender and generous as a man ought to be, and as a man of great intelligence usually is." His eccentricity of manner became well known to the public and it is recorded that on one occasion a lady entered his consulting room and stood before him with an outstretched injured finger. Abernethy dressed it, and the lady withdrew after placing the usual fee on the table. Not one word passed between them. In a few days she called again, and showed her finger. "Better?" asked the surgeon; "Better," said the patient. No other conversation but these two words was indulged in. This happened on three or four occasions, until eventually the patient came one day and held out her finger free from bandages and quite healed. "Well?" asked Abernethy; "Well," replied the patient. "Upon my word, madam," exclaimed the delighted surgeon, "you are the most rational woman I ever met!"

The pupils of John Hunter exist today and will exist so far as one can tell for all time. The eloquent Hunterian Lecture delivered by Dr. Finney last year on "The Influence of John Hunter on American Surgery," reveals how widespread are the effects of the Hunterian tradition.

A great master inevitably attracts loyal and enthusiastic assistants, and the Hunters were no exception. Perhaps one of the most famous was William Hewson, who shared with William Hunter the duty of lecturing in his anatomical school. He also was involved with Alexander Monro in a controversy about the lymphatic system. Hewson injected the whole of the absorbent system in birds, amphibia and fishes, and his work well merited the Sir John Copley Medal which was awarded him by the Royal Society. Even Jesse Foot has referred to him as "the immortal Hewson."

But perhaps the most celebrated of all Hunter's assistants, and the name that is most honored by posterity, is that of William Clift. This is, perhaps, the more curious inasmuch as William Clift began his work at the end of Hunter's life, and was only with him for one year and eight months. He was a boy at the time of his arrival, and his job was to help copy headings dictated by Hunter from the various MSS.; also to look after the specimens. At Hunter's death, Clift was thrown into starvation and Mr. Stephen Paget says that he had to exist for seven years on seven shillings a week, which was all that John Hunter's executors could allow him. There was, however, an additional sum allocated to him, with permission to use enough spirits to preserve the specimens.

During this period Clift immersed himself in the Hunterian MSS. and documents and happily copied many of them. In 1800 Clift was made Conservator of the Museum, when the Royal College of Surgeons came into existence, at the salary of £100 per annum. It was indeed fortunate that so industrious and loyal a servant as William Clift was associated with John Hunter at the end of his career. Had it not been for the devotion of a mere boy, much of his work would have been lost. The story is worth repeating.

When John Hunter died his brother-in-law, Everard Home, and his nephew, Matthew Baillie, were appointed joint executors. The Hunterian MSS. were housed by Home, and in July, 1823, he burned nearly the whole of the collection. Possibly this deed would not have been discovered for many years, had it not been that in the process of destruction Home very nearly set his house on fire, and the fire brigade insisted on an entry. Home's subsequent letter of explanation, affirming that John Hunter himself wished his MSS. eventually to be destroyed has never been believed, either then or now. So great was the storm of indignation when his iniquitous deed became public, that a Royal Commission of enquiry was held, at which Clift during his evidence nearly burst into tears on more than one occasion. Sir Everard Home's "Lectures on Comparative Anatomy," which were published after John Hunter's death, are chiefly of value because they contain so much of Hunter's own work.

The fame of Sir Everard Home, in common with so many others, rests largely on association with John Hunter, but the blot on his reputation can never be erased.

[From Schenckius: Observiationum Medicarum, Francofurti, 1609]

EDITORIAL

ANCIENT HERBALS*

THERE has developed of late a great interest in the extent and limitations of scientific study and research during the Medieval Period, particularly on the part of those interested in the history of medicine, and nothing in this vast field of investigation has yielded more interesting results than the careful study of the "herbals" which constitute so large a portion of the legacy of monastic medical writings. Among the vast collections of manuscripts in the old libraries of Europe and England are many interesting relics of this kind which are now being studied not as individual samples of monastic industry but as valuable guides to the cultural history of the times and lands in which they were compiled. The labors of Wellman, Sudhoff, Sigerist and Howald, have thrown a great light on this field. Last year Charles Singer[1] published a study entitled "The Herbal in Antiquity," in which the method by which such documents are studied and the ends achieved by it are shown more clearly than in any other English treatise known to us. These old herbals are not simply studied for the interest of their texts but as indications or landmarks of the cultural status of the writer, the source from which he derived his information and the place and circumstances under which it was composed. It is not enough to simply translate a text and reproduce its pictures. Practically all of the medieval herbals of which we possess the manuscripts were copied from earlier ones of which the originals no longer exist. The problem as to the genealogy is one which taxes, not only the erudition, but also the analytical or detective ability of those who study them to the highest degree. The medieval scribes were in the very nature of their profession copyists and in many instances plagiarists. For hundreds of years the literary efforts of the monastic writers were chiefly confined to copying such works of their predecessors as fell into their hands. In the course of these successive copyings the texts, and particularly the illustrations accompanying, became more and more corrupt and different from their originals. The most valuable material for study lies, as one would naturally expect, in the manuscripts which are illustrated. Singer[1] has elsewhere traced the general course of botanical knowledge with the Greeks showing that if Theophrastus was the "father of botany," Krateuas, who lived in the first century B.C., was the father of plant illustration. In the famous Juliana Anicia Codex, many of the figures are copies of drawings made by him or under his supervision in the first century, B.C. This Codex, now in the Library of San Marco at Venice, was formerly in Vienna. It was written about the year 512 as a gift for presentation to Juliana Anicia, daughter of the Emperor Anicius Olybrius, and the text is drawn from a number of different authors, chiefly Pedonios Dioskurides, on botany. The illustrations are copied from much earlier documents and Singer reproduces one showing Krateuas at work painting a plant, of which Dioskurides is writing down a description, while Epinoia, the genius of Intelligence, stands between them with a mandrake in her hand. The scribe specifically states that the accounts of the uses of eleven of the plants are taken from the text of Krateuas, and the figures illustrating them are presumably copied from the older Krateuas herbal.

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*By kind permission Dr. Gunther, we are able to reproduce some of the illustrations from the Herbal of Apulius which he has edited.

[1] *J. Hellenic Studies,* 1927, XXVII. A publication such as this illustrates the value of the periodical *Isis* to the student of medical history. Its pages contain references with abstracts to all the current literature which bears on any of the sciences, in that way collecting many references not obtainable in any of the lists of current medical literature. It should occupy a place in every medical library.

FIG. 1.

At the date when the Juliana Anicia manuscript was written drawing from nature was a lost art. The illustrations it contains were all copied from other manuscripts and those that are known to have been copied from Krateuas are, as Singer shows, among the very best. In order to give an idea of the nature of the herbal of Krateuas,

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[1] Studies in the History and Method of Science, edited by Charles Singer, Oxford, 1921.

Singer reproduces his illustrations with his descriptions of the plants accompanying them. Their great importance will be acknowledged when we realize that throughout the Middle Ages they were the original sources of the illustrations of most of the herbals which constituted so important a feature in the medical literature of the time, and we can also trace how their original accuracy suffered at the hands of the successive copyists who sought to reproduce them, undergoing a succession of changes which gradually rendered them unrecognizable in the conventionalized forms which were finally evolved. Singer mentions a few manuscripts in which a slight effort at originality in plant figures may be found, but they are pathetically few. The greatest of all the botanical writers of antiquity was Dioskurides, who flourished in the first century, A.D. The herbal of Dioskurides mentions about five hundred plants, very many of which have been identified from his descriptions. The Juliana Anicia manuscript is largely drawn from Dioskurides partly from Galen, and, as said before, partly from Krateuas. Singer states that the codified botanical knowledge of the West during the Dark Ages and until the twelfth or thirteenth century was contained for the chief part in three Latin works of which there were countless manuscripts. These three works, which were often compounded in various proportions to form a single text were the "Materia Medica" of Dioskurides, the "Herbarium" of Apuleius, and the pseudo-Dioskuridean "De Herbis Femininis." Dioskurides had been translated into Latin in the time of Cassiodorus (490–585), who recommended its study in illustrated manuscripts to those of his monks who

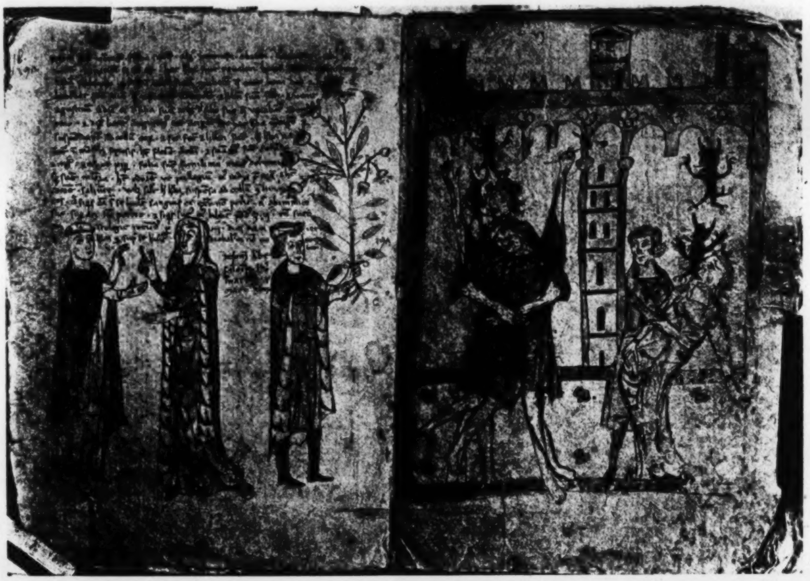

FIG. 2.

were unable to read Greek. The "Herbarium" of Apuleius, was compiled in Latin in the fifth century, partly based upon Dioskurides and partly on the Medicina Plinii." Just why the name of Apuleius should be attached to it no one can explain. It was certainly not written by the author of the "Golden Ass," the Platonic philosopher, who flourished during the reign of the Antonines, whereas the Herbarium which bears his name was compiled in the fourth or fifth century. The "De Herbis Feminis" was drawn from Dioskurides, Apuleius and Pliny. It was probably compiled in the sixth century in Italy, but the earliest known manuscript of it dates from the ninth century.

The Bodleian Library possesses a most interesting manuscript of the "Herbarium" of Apuleius, which has recently been reproduced by Dr. R. T. Gunther.[1] As stated above it is based on Dioskurides and the Medicina Plinii, and Gunther quotes Withington as pointing out that the work shows the transition from heathen to Christian medicine. Apuleius was a pagan and in the older manuscripts the names of the herbs are followed by prayers and incantations to be recited while gathering them: "Early monkish transcribers Christianized the work by a slight alteration in the prayers, but in later medieval editions these are either omitted, as in the Anglo-Saxon version, or replaced by Creed and Pater Noster."

The manuscript of the "Herbarium" of Apuleius is followed by a supplementary "Herbarium" of Dioskurides, as is the case with many other of the manuscripts of Apuleius.

The illustrations which accompany the Bodleian Apuleius are of special interest, because though many of them are merely conventionalized copies of other scribes' work, some of them show that the monk of Bury St. Edmunds attempted to draw from nature. Singer[1] reproduces some very naturelike figures from the manuscript and gives a charming picture of the way in which it was written:

> Some monastic lover of plants at Bury St. Edmunds, early in the twelfth century, had set himself the task of preparing a herbal. He made good but rough naturalistic drawings, referring at times to the actual plants themselves. We can reconstruct his method. He had before him a herbal of the usual Apuleius-Dioskurides type. He began by identifying figures in his MS. with plants in the monastery garden. Then he painted. Thus for "Viperina" he adopted the milk thistle *Carduus Marianus*, then a garden plant from Southern Europe, where it is common in waste places, and now a weed of escape in Britain. Similarly for "Camedrum" of the ancient herbal he took *Teucrium Chameedrys*, another form which, though now established in parts of this country, is unquestionably a garden escape. For "Dracontia" he drew the southern *Dracunculus vulgaris* and for "Paeonia" a non-British *Orobus*. In general he preferred garden plants to wild forms. He depicted the plants as he found them, with little regard to the order of the MS. from which he took his text. Finally being unable to identify some of the figures in his original he

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[1] The "Herbarium" of Apuleius Barbarus from the early twelfth century manuscript formerly in the Abbey of Bury St. Edmunds (Ms. Bodley 130) described by Robert T. Gunther, Oxford. Printed for presentation to the members of the Roxburghe Club, M.C.M.XXXV., by Captain Edward Gough Spencer Churchill, Introduction and editing by R. T. Gunther.

[1] The Herbal in Antiquity, *loc. cit.*

copied them. This he did, for instance, with "Solago minor," linking, however, the wrong figure with the text.

Gunther points out that these naturalistic representations are obviously of less assistance in the study of the continuance of the tradition than the conventionalized copies of previous figures. He also states that such a resort to drawing directly from nature has often happened because the original figures have become, through repeated copying, so degraded that they have ceased to bear any likeness to the plants they were supposed to represent: "The artist had perforce to imitate, perhaps exaggerate, some rude and damaged sketch before him and to draw freely on his imagination when it failed. Thus the tuber of a bulbous plant might in the later copies of a manuscript become a flower pot."[1]

Singer[2] prints a genealogical chart showing the lines of descent of the more important MSS. of Herbal of Apuleius, which illustrates graphically the general way in which such manuscripts were passed from one tongue or country into another and the changes which befell them in the transmission.

In the United States we sadly lack the material for studies such as the above from original sources. Our libraries contain but few medieval manuscripts, not enough to be studied as a comprehensive field. We should therefore appreciate the work of the English and Continental scholars who by reprinting some of the treasures in their hands are enabling us to study them.

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[1] It is unfortunate that the beautiful and scholarly work of Dr. Gunther is not published in such a way as to render it more generally available to scholar. The Roxburghe Club puications are printed in very limited editions for the members of the Club and the circulation is hence confined to a small nu circul

[2] The Herbal in Antiquity, *loc. cit.*

BOOK REVIEWS

Sir Isaac Newton, 1727–1927. A Bi-centenary Evaluation of his Work Edited by F. E. Brasch. Introduction by David Eugene Smith. Baltimore, The Williams and Wilkins Company, 1928.

This volume, "Special Publication No. 1 of the History of Science Society," contains thirteen essays by different authors dealing with the various scientific activities of Sir Isaac Newton. Aside from his wonderful discoveries of the underlying principles of physics and optics, Newton's work has but little bearing on medicine except, and it is an important exception, for the great influence he exerted both directly and indirectly on the orientation of scientific methods in the fields of research. The tremendous impetus given to mathematics and physics by the great discoveries made in those subjects by Newton and others was of great importance in the founding of the iatro-mathematical school of physicians, and Newton's studies in optics laid the basis for that science for all time.

As a Fellow of the Royal Society Newton came in contact with the illustrious men who figured during his time on its roll. There is no record, however, of his having partaken in any of the investigations in anatomy and physiology in which they were so profoundly interested. Newton's interest in chemistry was directed almost entirely towards metallurgy. From his notebooks, which are largely quoted by Lyman C. Newell, in his article in this book, entitled "Newton's Work in Alchemy and Chemistry," we find that he was deeply interested in the subject of the transmutation of metals, and that he had read and annotated the books of many of the old alchemical writers. Newell does not think that Newton really sought to accomplish the transmutation of metals, rather he made a diligent search "for a great principle which would transform disconnected chemical phenomena into a philosophic system."

Although, therefore, this book has not a very distinct bearing on the history of medicine, it is a most invaluable contribution to the history of physics and mathematics, and consequently will be welcomed by those who are interested in the broader aspects of the history of science.

Francis R. Packard.

Exercitatio Anatomica De Motu Cordis Et Sanguinis In Animalibus, Guilielmi Harvei Angli, Medici Regii, & Professoris Anatomiae In Collegio Medicorum Londinensi. Francofurti, Sumptibus Guilielmi Fitzeri. Anno m.dc.xxviii. Monumenta Medica Vol. v. Florence, R. Lier and Co., 1928.

This facsimile of the first edition of Harvey's great work, the most famous medical book ever printed, forms a worthy addition to the admirable series of books which have heretofore appeared in the series of "Monumenta Medica." It forms an apt contribution to the world-wide celebration of the tercentenary of the publication of the original. It is safe to assert that no one book, even the great "de Fabrica" of Vesalius, ever produced so profound an effect on medical thought and progress. The original has now become of such rarity, even the previous reprints are out of print and hard to obtain, that there exists a real demand for a facsimile such as the one before us. Needless to say that its accuracy is unquestioned and the beauty of its appearance beyond reproach. The low price at which it is available will place it within the reach of the great number of those who would wish to have Harvey's original text at hand.

Francis R. Packard,

Esculape chez les Artistes. Docteur Cabanès. Librarie le François Paris, 1928.

This new work by the versatile Dr. Cabanès is a collection of pictures, drawn from many sources from the earliest times to the present day, which present points of interest from the medical point of view. The Author's classification differs from that of Hollander, Naas, and others in that it is more clinico-pathological than either chronological or artistic. There are about two hundred illustrations many of which are familiar to most readers. An explanatory text accompanies the illustrations, which are well reproduced and well chosen to illustrate the points which the author wishes to elucidate in regard to the various deformities and diseases which have been illustrated by different artists.

Francis R. Packard.

Die Entwicklung der Lehre van den Herz Krankheiten. By Professor Max Neuburger. *Wiener Medizinischen Wochenschrift*, Nos. 3 and 4, 1928.

This is an interesting short sketch of the history of the development of our knowledge concerning heart disease. The influence of pathology and of the discoveries in the methods of physical diagnosis is pointed out. Attention is drawn to the confusion which resulted from the symptoms secondary to cardiac failure being regarded as representing the essential disease, an error which is sometimes made to-day. In an article of sixteen pages it is impossible to dwell at great length on the development of the knowledge of this subject, but the author has given a great deal of information and brought out the remarkable number of workers who contributed to the subject. It is a long story with many characters.

Thomas McCrae.

Max von Pettenkofer. His Theory of the Etiology of Cholera, Typhoid Fever and Other Intestinal Diseases. A Review of His Arguments and Evidence. By Edgar Erskine Hume, M.D., DR.P.H., LL.D., Major, Medical Corps, U. S. Army. With 8 full page plates. N. Y., Paul B. Hoeber, Inc., 1927.

Ask one of the older generation of physicians what association is connected with the name Pettenkofer and he will probably answer "ground water." He may perhaps add that he was concerned in much controversy regarding the method of transmission of cholera and typhoid fever from the sick to the healthy, and that to prove his own theory he swallowed living cholera vibrios. These would be correct but they really do not give his chief claims to fame. His important researches in chemistry, his extensive work in many departments of hygiene and his contributions to the subject of public health have been largely forgotten. Major Hume has given us an interesting sketch of Pettenkofer and discussed his theories and controversies in an entertaining fashion. He points out that a complete bibliography of Pettenkofer's work has never been published and lists 285 items.

Max Pettenkofer, a Bavarian, was born in 1818 and was brought up by his uncle, a chemist, so that his studies in this subject began at an early age. He graduated in medicine in 1843 but does not seem to have been interested in medicine as much as in the relation of chemistry to medicine. The next year he went to Giessen where he worked with Liebig and in 1847 he became professor of medical chemistry at Munich. He made discoveries with regard to such diverse subjects as platinum, the preparation of cement and the manufacture of illuminating gas from wood. Gradually his interest extended to problems of hygiene, especially regarding the ventilation and heating of buildings. With this he devised his method for the determination of carbon dioxide. Soon he turned to a study of the relationship between the soil and the air.

Perhaps what should be regarded as his greatest work, concerned the study of respiration, metabolism and food values.

He constructed a respiration chamber and was a pioneer in the study of metabolism. He was a many sided man as his interest in public health showed. To him was due the provision of a pure water supply and proper sewage disposal for Munich. With this fight for better living conditions went the struggle to obtain a place in the sun for hygiene. He finally was able to have hygiene recognized as a university department and he founded the first journal devoted to this subject. Later the first complete hygienic institute was opened at Munich.

To his views as to the method of conveyance of certain infectious diseases, brief reference only can be made here. Major Hume has summarized them and they illustrate the difficulty of arriving at the true and full explanation of a problem of infection. He did not believe that cholera could be conveyed directly from the patient to the healthy person. He considered that the soil played a part and in this the ground water and the permeability of the soil to water were important factors. There was much controversy especially with Koch and his followers. Many of the errors on both sides resulted from generalizing from a few cases.

A man of wide interests, an unusual investigator in chemistry, physiology and metabolism, a pioneer in the study and teaching of hygiene, he deserves to be kept in mind and Major Hume deserves our thanks for the interesting sketch which he has given.

THOMAS MCCRAE.

GRUNDLAGEN UND ZIELE DER MEDIZIN DER GEGENWART. Von Theodor Brugsch, Curt Else, Louis R. Grote, E. Liek, W. Mayer-Gross. Leipz., Georg Thieme, 1928.

The Institute of the History of Medicine of Leipzig has inaugurated lecture courses on general medical topics of the day. In the small volume now published are gathered the lectures of the first course given in the winter of 1927–28. The opening address by Curt Else on anatomic thinking points out the inadequacy of the purely anatomic concept. Grote in the second lecture emphasizes the functional basis of medicine. He dwells on the importance of the subjective symptoms of disease, an importance realized long ago by James McKenzie, Bergmann, Goldscheider, and Ortner. The newer concept does not admit that disease affects an organ merely, but insists that disease involves the entire body, whence the idea of the biology of the person with which F. Kraus and Brugsch have dealt so largely.

Theodor Brugsch in an address on the "clinic" endeavors to recall medicine from the detached and purely scientific point of view to the Hippocratic ideal which places the patient in the foreground. There seems to be a sort of Hippocratic renaissance in Germany and everywhere one hears the slogan, "back to Hippocrates." As always in Germany the movement immediately finds its expression in a new journal, called *Hippocrates*.

The essay by W. Mayer-Gross discusses the problems of the modern neurologist. Mayer-Gross also emphasizes the need of looking at the patient as a whole and not through the narrow slit of a specialty.

By far the most interesting essay is that of E. Liek, a surgeon of Danzig, who draws a gloomy picture of the economic side of medical practice in Germany. Apart from the fact that general practice is gradually losing one field after the other, the lot of the German physician has been made almost unbearable by the Krankenkassen and other developments of paternal legislation. The average gross income of the Kassenarzt, corresponding to the panel doctor in England, is 9000 marks, from which an overhead of 30 per cent has to be deducted. What remains is not a large sum, but the Kassen pay promptly, while among private physicians the practice of sending bills is falling more and more into desuetude because it is held to offend good manners. So many persons are attached to the Kassen, hence entitled to sick benefits, that the people are looking more and more upon the physician as an employer, through whom they receive pay, than as a healer. He who is willing to connive and sign certificates liberally has the biggest following and the largest income. The insurance system thus tends to demoralize the profession on its ethical side, while the lack of close personal interest in the patients demoralizes it on the scientific side. But the paternal system is also injurious to the Nation at large:

1. Accident insurance kills the urge to work.
2. Sickness insurance paralyzes the desire for health.
3. Old age insurance destroys the will to save.

And to this may be added:

4. The non-employment dole removes the desire for work.

Recently Stappert described what he calls Weihnachtsfieber, which manifests itself in an enormous increase in sick benefits demanded about the Christmas holidays. In Danzig the average weekly outlay for sick benefits is 4000 guilders; during the week before Christmas it rises to 26,000 guilders.

Liek does not blame the insured so much as the whole system of paternalism. All the forms of insurance originally hailed as great forward steps in social legislation have had an injurious effect upon the fiber of the people—they have undermined the sturdiness of the German working classes and have produced a conscious desire to deceive so as to get as much as possible from the public purse. The whole system favors the shiftless and the inefficient at the expense of the industrious and capable.

Although exceedingly pessimistic, Liek nevertheless sees a few rays of sunshine breaking through the dark cloud. First, there is the indestructible ideal of the doctor's mission. Secondly, despite the mechanistic tendencies in modern medicine, the physician of the future will still be the sympathetic friend of the sick, to whom science and technique are not the essentials of his calling, but only a means to an end. And thirdly, and here again appears the Hippocratic revival, the physician will evaluate the man as a whole and thus free himself from exaggerated medical specialism.

There is no prospect of radical changes in the insurance legislation of the Reich, in fact some of the measures in contemplation will make the position of the Kassenartz still worse. Improvement might follow if the Kassenartz were made a salaried official, for then he would be independent of his patients and would have no motive for shutting his eyes to abuses.

Liek's article is undoubtedly the most interesting in the book and reads convincingly; yet one would like to see the other side of the picture, the more so as the whole question of the socialization of medicine will some day have to be faced in America.

David Riesman, m.d.

Kyklos. Jahrbuch des Instituts für Geschichte der Medizin an der Universität. Band i. Leipz., Georg Thieme, 1928.

The articles in the first volume of *Kyklos* are highly technical. The first deals with the "Corpus Hippocraticum." The second, written in faultless English by Stephen d'Irsay, is an erudite disquisition on Time-Implied Function. The introduction of the element Time into anatomy, due to William Harvey, is the starting point of physiology. The proper concept of the time element was delayed by the long-continued sway of the doctrine of causality. A change in thought was brought about during the Renaissance when causal thinking, at least in the domain of science, gradually disappeared. However, Vesalius still defines organic functions not relationally, but causally; he is not in the modern sense a physiologist. Various other considerations, largely of a metaphysical nature, culminate in d'Irsay's conclusion that as quantitative time and functional difference are purely virtual, it follows that the entire consideration of the phenomenal world is virtual. In this conclusion it is the time concept that represents the ordering purpose and maintains firm relations and acquaintance with the meaning of function and the purpose of things.

Sigerist, in a brief article, tries to show that there is a relation between cultural movements and epidemic diseases. The plague of Justinian in the sixth century coincided with the final breakup of the Roman Empire and the rise of a new civilization—in Italy that of the Lombards, in the East that of the Byzantine Empire and the birth of Mohammed. The fourteenth century plague marks the turning point between the middle ages and modern times. The Renaissance is the age of individualism. It is characterized not by any great epidemic that attacks nearly all persons, but by an individualistic disease, syphilis, which one acquires through a purposive act. These ideas are suggestive but need to be substantiated by thorough documentary study. Such study the Leipzig Institute has in contemplation.

Professor Sigerist has tried by means of a questionnaire to ascertain to what extent medical history is being cultivated in the universities of the world. Curiously, the most progressive of countries is Poland which in every one of its five universities has a Chair for medical history. In the United States, Johns Hopkins University naturally stands out with its magnificent endowment for an institute of the history of medicine, an institute that has happily been placed under the control of that vigorous scholar, W. H. Welch, and from which a powerful influence will no doubt radiate to the medical schools of the country. According to Sigerist's statistics of the United States, some attention is being paid to medical history in the University of Maryland, the University of California, Harvard, Northwestern, the University of Wisconsin, Cornell, the University of Pennsylvania, and Washington University. In Germany medical history receives little official recognition, nevertheless an extraordinary amount of good work is being done under unfavorable conditions.

D'Irsay urges the creation of an historical dictionary of medicine. As such a work is undoubtedly needed, the reviewer hopes that some rich American will come forward and supply the required funds for a polyglot dictionary and that d'Irsay himself will be entrusted with the headship of the undertaking.

DAVID RIESMAN.

A HISTORY OF PRINTING, ITS DEVELOPMENT THROUGH FIVE HUNDRED YEARS. By John Clyde Oswald. New York, D. Appleton and Co., 1928.

It is only within comparatively recent years that there has been any widespread interest on the part of physicians in the early classics of their profession. Twenty years ago the few seekers of medical incunabula could pursue their stealthy pleasures and capture prizes of a kind which are daily becoming more and more inaccessible. Thus collectors like Stockton Hough, Samuel W. Lewis, George L. Huntington and Sir William Osler, not to mention some eminent instances among our living colleagues were able to gather their invaluable collections.

Book collecting has become a science in which to insure success it is necessary to study many different aspects of the subject. For this purpose nothing is more useful than knowledge of the art of printing and its early history.

Mr. Oswald's book is an excellent companion and guide to anyone who wishes to understand the development of the printed book and gain an insight into the history of the early printers and their publications. It is beautifully and copiously illustrated with facsimiles of pages typical of the works issued by the more famous presses from Gutenberg to the present day. To the many members of the medical profession who are now entering the alluring paths of the maze of collecting we can heartily recommend it as a textbook.

FRANCIS R. PACKARD.

STORIA DELLA MEDICINA. By Arturo Castiglioni. Milan, Soc. Edit. Unitas, 1927.

The author of this work is Professor of the History of Medicine in the University of Padua. Some years ago we had the pleasure of reviewing his book "Il Volto di Ippocrate," a series of essays on various aspects of medical history which showed the ability and erudition of its author. The present work fully sustains Professor Castiglioni's high reputation as a medical historian. It is very similar in plan to that of Garrison and, as the latter, far superior in plan and execution to the older histories of Daremberg, Baas and Pagel. Beginning with the most remote antiquity, of which we find the record in the drawings and other remains of cave-dwelling man, Castiglioni gives us a continuous record of the history of medicine down to the present time. The science of paleopathology is of very recent origin and our knowledge of the diseases and injuries of prehistoric man has been increased, by discoveries in the caves of Southern France and elsewhere which have thrown light on a hitherto untrodden field. Also the discoveries and studies of Elliot Smith, Breasted, Ruffer, and Jastrow have considerably changed our views on the medical history of Oriental peoples. Castiglioni shows on every page his familiarity with the most recent acquisitions of paleopathology and archaeology. His history of the medicine of Greece and Rome manifests that he has read the classic medical writings at first hand. As would be expected the history of the School of Salerno, of the rise of the Italian Universities and of the glories of Italian medicine in the fourteenth and fifteenth centuries constitute a great feature of the book. This is not from any excess of patriotism, but because the author is evidently more at home in this great epoch than any previous historian and has used his profound knowledge to the best advantage in narrating the story of some of the most fascinating centuries in the history of medicine. Nevertheless he shows the same grasp of his subject and writes with perfect justice of the great schools of medicine which arose in France, England and Germany, and in their time equalled the glories of their Italian predecessors. Castiglioni's history of the rise of modern pathology and bacteriology is noteworthy for its inclusiveness. No discovery or advance of any importance has apparently escaped his patient research. His account of the rise of the various specialities is also most noteworthy. To the various sections of the book are appended very excellent bibliographies, which comprise references to a surprising number of English and American authors. These bibliographies are not merely lists of names of books or articles in journals, but are accompanied in many instances by remarks indicating the particular feature to be found in the listed publication.

Professor Castiglioni has not only written an invaluable work of reference; the book is also delightful to read. It is copiously illustrated and among the pictures are many with which we have not heretofore met. An excellent index adds greatly to the book's value.

FRANCIS R. PACKARD.

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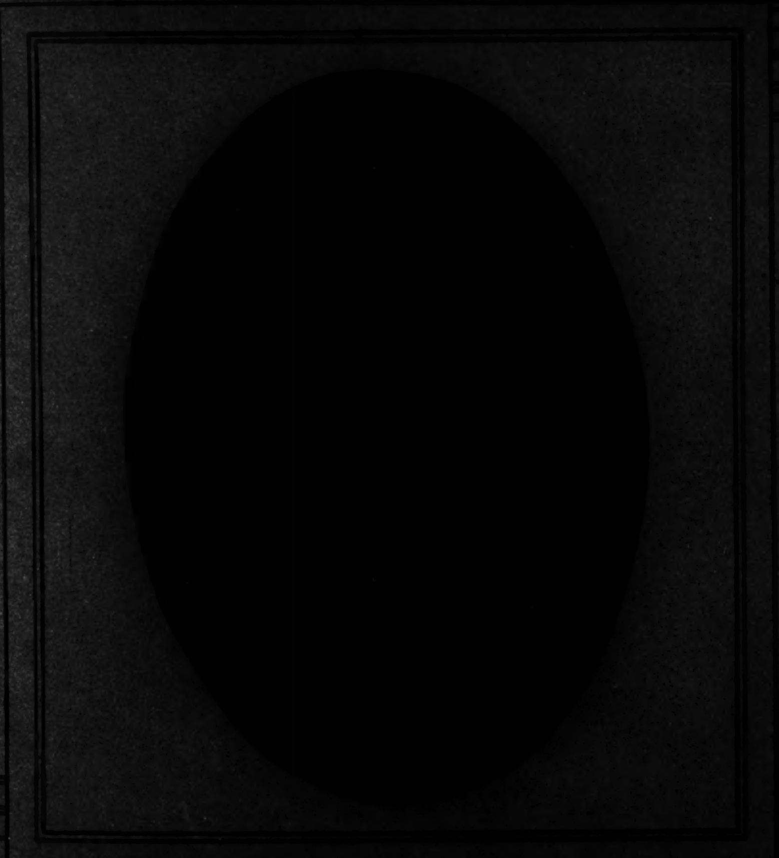

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